IMPERIAL COUNTY

AIR POLLUTION CONTROL DISTRICT

Storm moving in Shot from Palm Desert; https://www.youtube.com/watch?v=VT1hh41FS7c

June 30, 2015
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL REPORT

October 4, 2018

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ACRONYM	DESCRIPTIONS
AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
LST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service

PDT	Pacific Daylight Time
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center

I Introduction

On June 30, 2015, a State and Local Ambient Air Monitoring Station (SLAMS), located in Niland California (AQS Site Code 06-025-4004), measured an exceedance of the National Ambient Air Quality Standard (NAAQS). The Federal Equivalent Method (FEM), Beta Attenuation Monitor Model 1020 (BAM 1020) measured a 24-hr average (midnight to midnight) Particulate Matter less than 10 microns (PM_{10}) concentration of 183 µg/m^3. PM_{10} 24-hr measurements above 150 µg/m^3 are exceedances of the NAAQS. The SLAMS in Niland was the only monitor in Imperial County to measure an exceedance of the PM_{10} NAAQS on June 30, 2015.

TABLE 1-1
CONCENTRATIONS OF PM_{10} ON JUNE 30, 2015

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION µg/m^3	PM_{10} NAAQS µg/m^3
6/30/2015	**Niland**	**06-025-4004**	**3**	**24**	**183**	**150**
6/30/2015	Brawley	06-025-0007	3	23	88	150

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted[1]

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from Federal Reference Method (FRM) Size Selective Inlet (SSI) instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM_{10} data was non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM_{10} data from BAM 1020's into the USEPA managed AQS. Because regulatory consideration of reported data must be in standard conditions, as required by USEPA, all continuous PM_{10} data since 2013 is regulatory. On June 30, 2015 the Niland monitor was impacted by entrained windblown dust when high winds associated with the intrusion of unstable monsoonal air and a large disturbance that made its way from the southeast to the northwest through western Arizona and southeastern California. High winds associated with outflow boundaries swept across the southern and eastern parts of Imperial County.[2]

This report demonstrates that a naturally occurring event caused an exceedance observed on June 30, 2015, which elevated particulate matter and affected air quality. The report provides concentration to concentration monitoring site analyses supporting a clear causal relationship between the event and the monitored exceedances and provides an analysis supporting the not reasonably controllable or preventable (nRCP) criteria. Furthermore, the report provides information that the exceedance would not have occurred without the transport of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert. The document

[1] According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term "standard time" or "daylight time". For year-round use, the designation can be left off inferring "local time" daylight or standard whichever is present. For 2015, Pacific Daylight Time (PDT) is March 8 through November 1. https://www.nist.gov/pml/time-and-frequency-division/local-time-faqs#intl

[2] Area Forecast Discussion National Weather Service San Diego CA 114 PM PST (214 PM PDT); 830 PM PST (930 PM PDT) Tuesday, June 30, 2015

further substantiates the request by the ICAPCD to exclude the PM_{10} 24-hour NAAQS exceedance of 183 µg/m[3] (**Table 1-1**) as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[3].

I.1 Demonstration Contents

Section II - Describes the June 30, 2015 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the event affected air quality. Overall, this section provides the evidence that the event was a natural event.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Niland station this section discusses and establishes how the June 30, 2015 event affected air quality such that a clear causal relationship is demonstrated between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM_{10} data measured in local conditions and standard conditions. PM_{10} continuous data prior to 2013 is in local condition measurements, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the June 30, 2015 event and its resulting emissions defining the event as a "natural event".[4]

Section IV - Provides evidence that the event of June 30, 2015 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality, that the event was not reasonably controllable or preventable, that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

I.2 Requirement of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, in order for the USEPA to concur with flagged air quality monitoring data, there are additional non-technical requirements.

[3] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007

[4] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD published the National Weather Service (NWS) forecast for June 30, 2015 through July 4, 2015. The published notification, via the ICAPCD's webpage, forecast included a threat of brief heavy rain with south winds 5 to 10 miles per hour (mph). The evening forecast included a chance of showers and thunderstorms with southwest winds 10 to 15 mph. The notification advised the public of the potential of increased particulate matter concentrations to unhealthy levels because of gusty winds with some blowing dust for the southern and eastern portions of Imperial County and strong gusty winds for the northern and western portions of Imperial County. Because of the potential for suspended particles and poor air quality, the ICAPCD issued a "Marginal Burn" day for Imperial County. "Marginal" burn days do not allow agricultural field burning only small piles of green waste. In addition, the Imperial Valley Press published a Significant Weather advisory effective through 1245pm advising of winds in excess of 40 mph with periods of heavy rainfall and areas of blowing dust, reducing visibilities at or below 3 miles. **Appendix A** contains copies of pertinent notices to the June 30, 2015.

I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. Notification occurs when an agency submits a request, which includes an initial event description, for flagging data in AQS.

On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule, which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

The ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM_{10} concentration from the Niland monitor on March 7, 2016. Subsequently there after the ICAPCD sent a revised request on March 18, 2016 providing additional information describing the event. **Table 1-1** above provides the correct concentration for Niland. The difference in concentrations between local and standard has an insignificant impact on any data analysis. The submitted request included a brief description of the meteorological conditions for June 30, 2015 indicating that a potential natural event occurred.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30-day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on January 10, 2018. The published notice invited comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 183 $\mu g/m^3$, which occurred on June 30, 2015 in Niland. The final closing date for comments was February 12, 2018. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(a)(1-2))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)). Currently, bi-weekly meetings between USEPA, CARB and Imperial County continue to discuss any potential documentation of events.

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the June 30, 2015 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2018.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR§50.14(c)(3)(iv))

A This demonstration provides evidence that the event, as it occurred on June 30, 2015 satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

- a The event created the meteorological conditions that entrained emissions and caused the exceedance.
- b The event clearly "affects air quality" such that there is the existence of a clear causal relationship between the event and the exceedance.
- c Analysis demonstrates that the event-influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
- d The event "is not reasonably controllable and not reasonably preventable."
- e The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."
- f The event is a "natural event" where human activity played little or no direct causal role.

B This demonstration provides evidence that the exceptional event affected air quality in Imperial County by demonstrating a clear causal relationship between the event and the measured concentration in Niland.

C This demonstration provides evidence of the measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship between the event and the affected monitor.

II June 30, 2015 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the June 30, 2015 event unfolded in Imperial County. The subsection elements include

» A description and map of the geographic setting of the air quality and meteorological monitors
» A description of Imperial County's climate
» An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (**Figure 2-1)**. The Colorado Desert not only includes Imperial County but a portion of San Diego County.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center, the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion, which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea, which is approximately at 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-6)**. Together, the incorporated cities, including Niland, and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter) mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The mountains and deserts of San Diego comprise the eastern two-thirds of San Diego County and are primarily undeveloped back county with a native plant community known as chaparral. Of the nine major mountain ranges within San Diego County, the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK

Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba_Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park, there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example, the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS

Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that affect Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

Historical observations have indicated that the desert slopes and mountains of San Diego are a source of fugitive emissions along with those deserts located to the east and west of Imperial County, which extend into Mexico (Sonoran Desert) (**Figure 2-7**). Combined, the desert areas and mountains of San Diego and the desert areas that extend into Mexico are sources of dust emissions, which affect the Imperial County during high wind events.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT

Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

FIGURE 2-6
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

Fig 2-6: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, and the City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south

FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

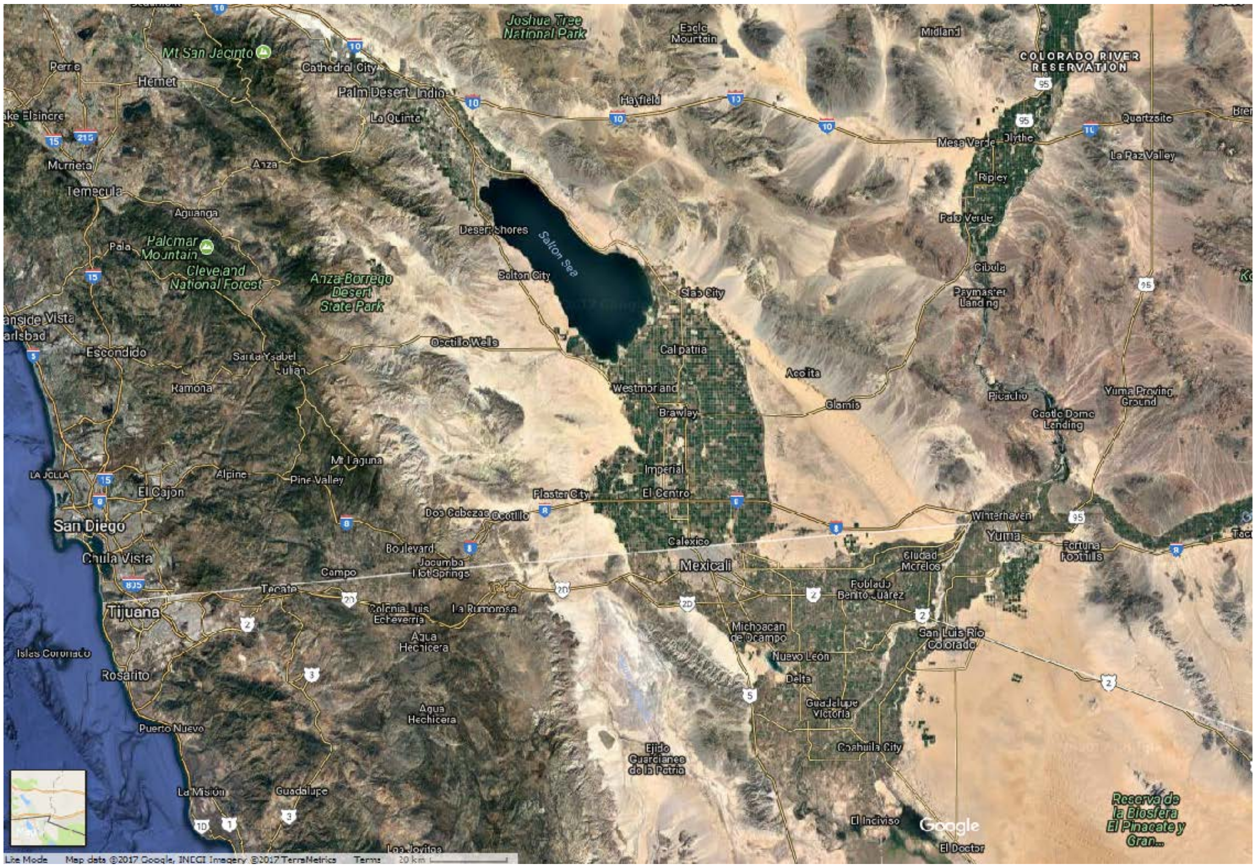


Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County. Source: Google Earth Terra Matrics

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. SLAMS in Imperial County are located in Calexico, El Centro, Westmorland, Brawley, and Niland. Each station measures air quality and meteorological data; the station located in Brawley only measures air quality and no meteorological data. Other air monitoring stations with air quality and meteorological data used for this demonstration include stations in Riverside County and Arizona (**Figure 2-8 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on June 30, 2015, occurred at the Niland station. The Niland station is one of the "northern" monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions of meteorological conditions occurring on June 30, 2015, other meteorological sites used in this demonstration include airports within eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), Imperial County, and other sites relevant to the wind event, such as within northern Mexico (**Figure 2-8)**.

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

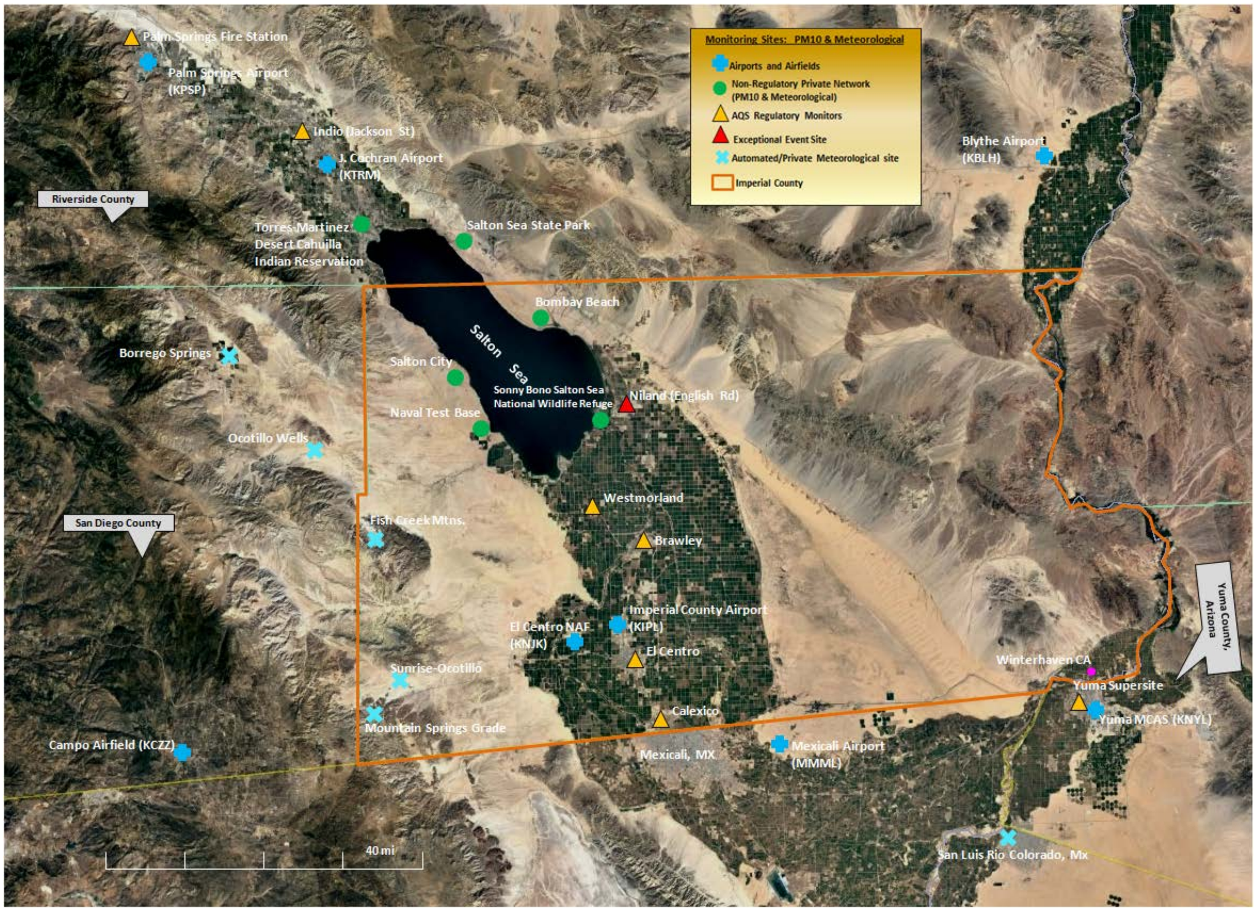


Fig 2-8: Depicts a select group of meteorological and PM_{10} monitoring sites in Imperial County, eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), and northern Mexico. The image provides the location of potential sites used to gather data in support of an Exceptional Event Demonstration. Source: Google Earth

In addition to meteorological sites, there are non-regulatory PM_{10} sites located around the Salton Sea that maybe referenced as an aid to help the reader understand the direction and velocity of winds that affect Imperial County. Unless, otherwise specifically indicated concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These privately owned stations are non-regulatory (**Figures 2-9 to 2-12**). The Salton City station is located 33.27275°N latitude and 115.90062˚W longitude, on the western edge of the Salton Sea (**Figure 2-9**). The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593˚W longitude, on the southwestern edge of the Salton Sea (**Figure 2-11**). The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the Salton City station, light chaparral vegetation and sandy open dune areas surround the Naval Test Base station. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and 115.62310˚W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. Bordering the Refuge is the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. View site photos at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST

Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe.
https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION

Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION
WEST

Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph taken from the west facing the probe.
https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION

Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

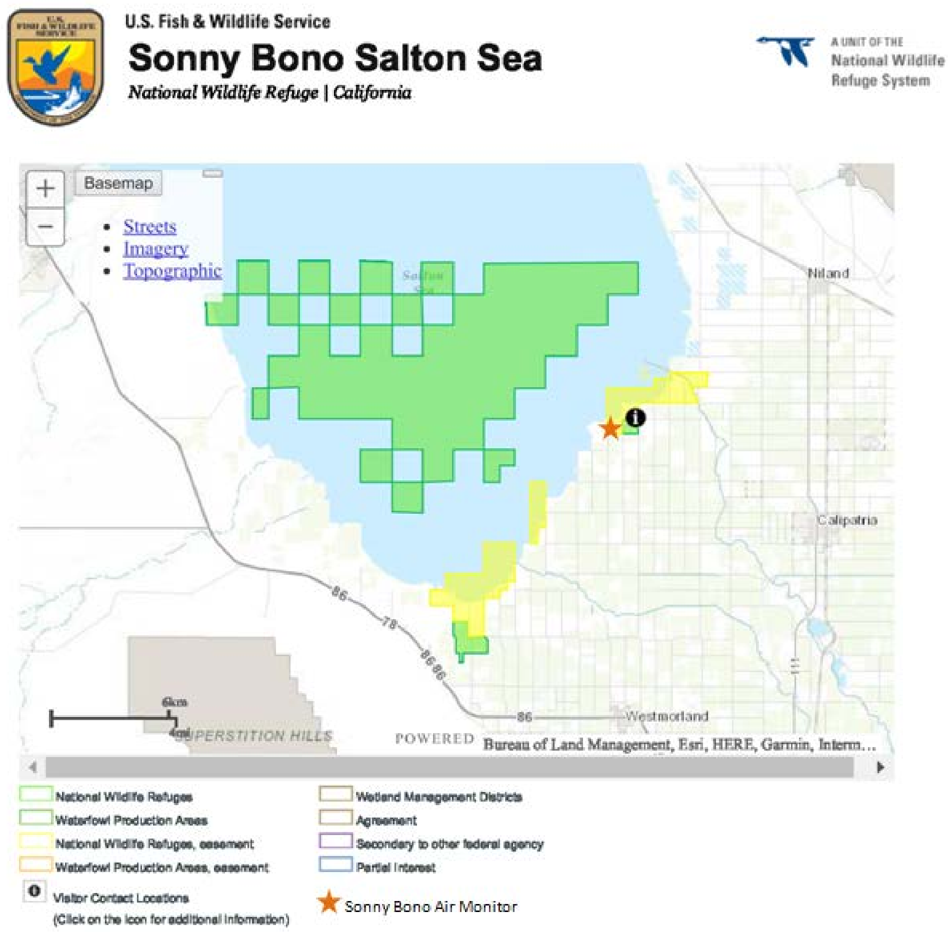


Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source: https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
JUNE 30, 2015

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	24-hr PM_{10} (µg/m³) Avg	1-hr PM_{10} (µg/m³) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY											
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	-	-	-	-	-
		BAM 1020					88	697	1100		
Calexico-Ethel Street	CARB	Hi-Vol Gravimetric	06-025-0005	(81102)	13698	3	-	-	-	15.2	1000
El Centro-9th Street	ICAPCD	Hi-Vol Gravimetric	06-025-1003	(81102)	13694	9	-	-	-	8.4	700
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-57	-	-	-	20.4	1100
		BAM 1020					183	992	1000		
Westmorland	ICAPCD	Hi-Vol Gravimetric	06-025-4003	(81102)	13697	-43	-	-	-	14.9	1100
RIVERSIDE COUNTY											
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	45	87	2000	-	-
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	87	187	1600	-	-
ARIZONA – YUMA											
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	139	841	600	-	-

*CARB = California Air Resources Board
*ICAPCD = Air Pollution Control District, Imperial County
*SCAQMD = South Coast Air Management Quality District
*ADEQ =Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question according to the zone time (PST unless otherwise noted)

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-15**) encompassing approximately 7 million acres (28,000 km²). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

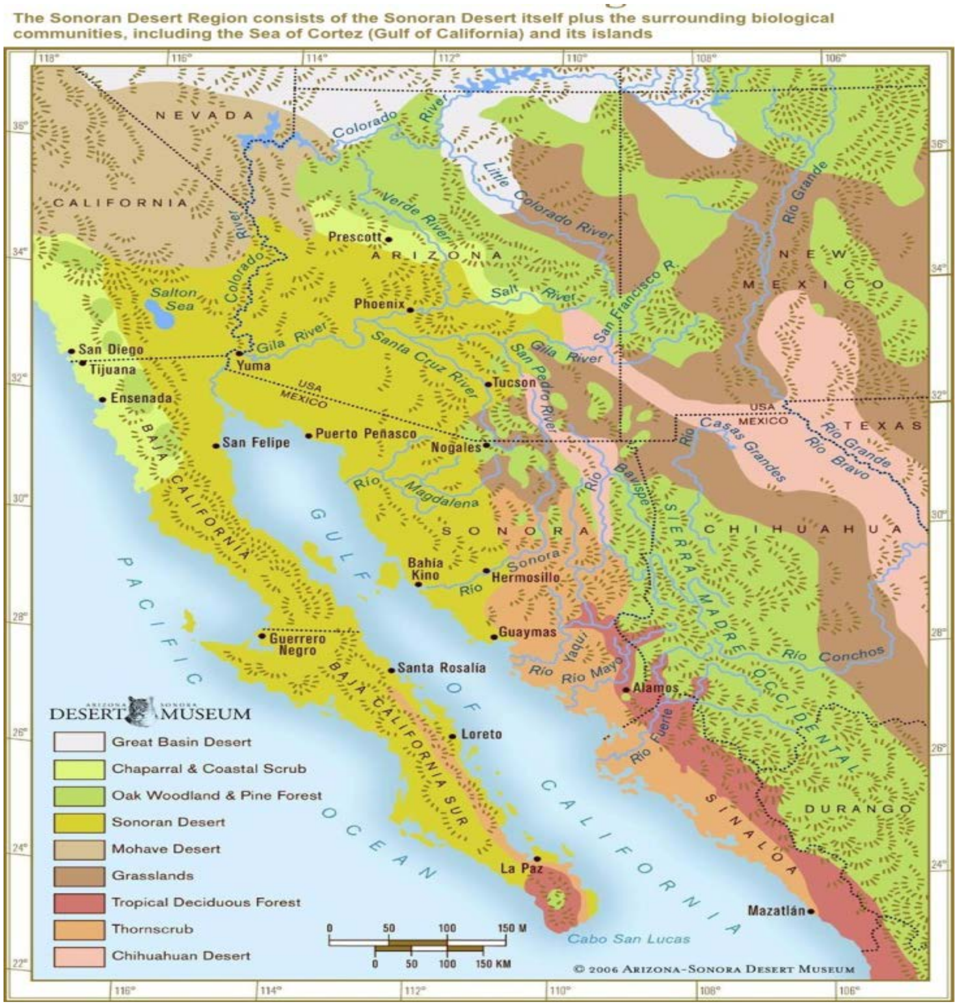


Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at http://desertmuseum.org/center/map.php

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 3.11" (**Figure 2-16)**. During the 12-month period prior to June 30, 2015, Imperial County measured total annual precipitation of 3.29 inches. The slight increase in precipitation of .018 inches was insufficient to relieve the existing arid conditions that result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

FIGURE 2-16
IMPERIAL COUNTY HISTORICAL WEATHER

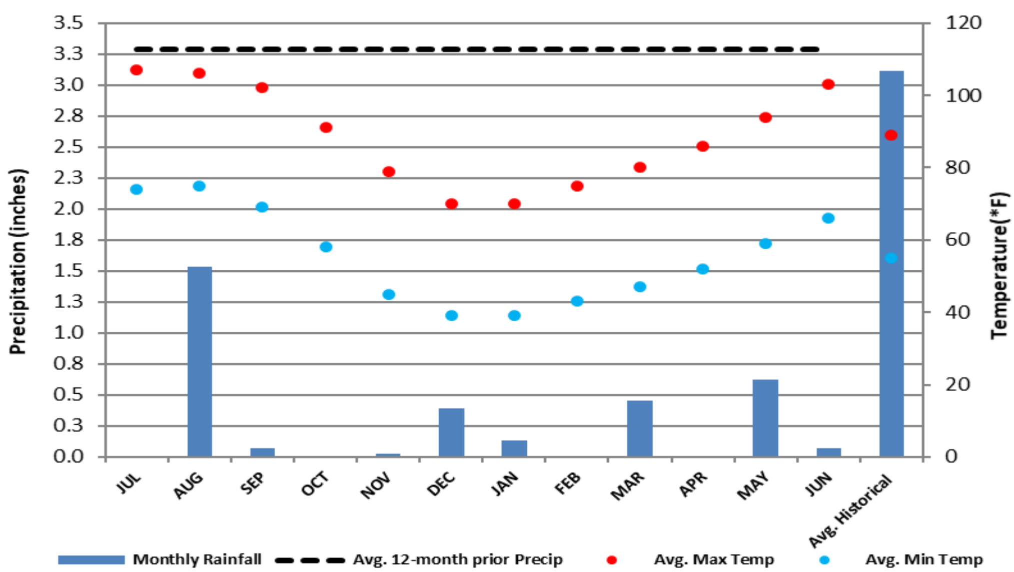


Fig 2-16: The total annual precipitation prior to the June 30, 2015 event measured 3.29 inches, which was slightly above the average annual precipitation of 3.11 inches, was insufficient to relieve the arid conditions existing in Imperial County. Meteorological data courtesy of Weather Underground, California Observed Climate Normals, and Western Regional Climate Center (WRCC) http://www.wrcc.dri.edu/cgi-bin/climain.pl?ca2713

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.[5] Because the pressure gradient is just the difference in pressure between high and low pressure areas, changes in weather patterns may recur seasonally.

Typically, high pressure brings clear skies and with no clouds, there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high-pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the fall, winter, and spring are often due to strong winds associated with low-pressure systems and cold fronts, windblown dust events during the summer monsoon season are often due to wind flow aloft from the East or South-East. This phenomenon is known as the North American Monsoon (NAM)[6]. The NAM occurs when there is a shift in wind patterns during the summer, which occurs as Mexico and the southwest United States warm under intense solar heating reversing airflow from dry land areas to moist ocean areas. Consequently, the prevailing winds start to flow from moist ocean areas into dry land areas (**Figure 2-17**).

[5] NWS JetStream – Origin of Wind http://www.srh.noaa.gov/jetstream/synoptic/wind.html

[6] National Weather Service document "North American Monsoon" public domain material from the NWS Forecast Office Tucson, Arizona

FIGURE 2-17
WEATHER PATTERN OF THE NORTH AMERICAN MONSOON

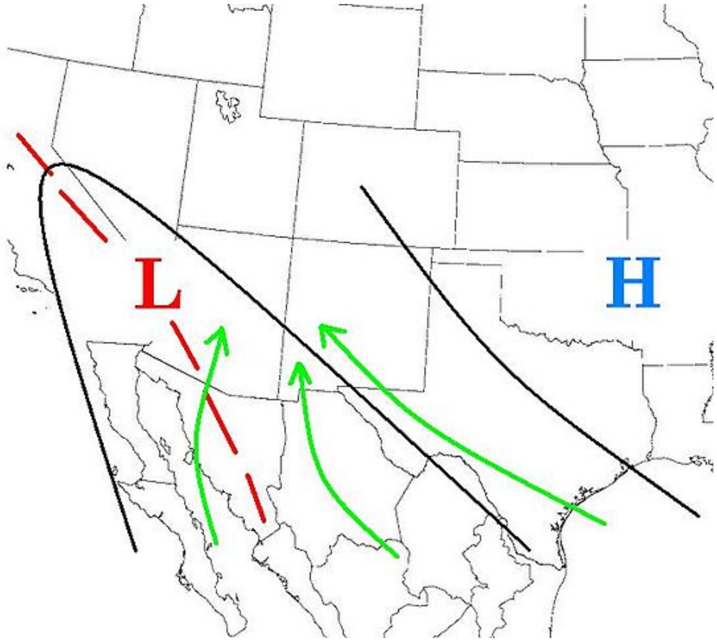


Fig 2-17: Weather pattern of the North American Monsoon. The North American monsoon, variously known as the Southwest monsoon, the Mexican monsoon, or the Arizona monsoon is experienced as a pronounced increase in rainfall from an extremely dry June to a rainy July over large areas of the southwestern United States and northwestern Mexico. Image courtesy of Wikipedia "North American Monsoon."

The NAM circulation typically develops in late May or early June over southwest Mexico and by July or August has become fully developed. By mid to late summer, thunderstorms increase over the "core" region of the southwest United States and northwest Mexico[7]. The transport of moisture into Mexico, Arizona and the southwestern United States can come quickly and sometimes dramatically , known as "bursts" and "breaks" which can unleash violent flash floods, thousands of lightning strikes, crop-damaging hail, and walls of damaging winds and blowing dust.[8]

The monsoon typically arrives in mid to late June over northwest Mexico and early July over the southwest United States. While the southern areas of Mexico experience a low level monsoon circulation, transported primarily from the Gulf of California and eastern Pacific, an upper level monsoon (or subtropical) ridge develops over the southern High Plains and northern Mexico. By late June or early July the ridge shifts into the southern Plains or southern Rockies creating less resistance for the mid and upper level moisture streams to enter the United States. If the ridge is too close to a particular area, the sinking air, at its center suppresses thunderstorms and can

[7] According to the NWS Tucson Arizona regional office report affected areas include the United States, Arizona, New Mexico, Sonora, Chihuahua, Sinaloa and Durango.
[8] 2004: The North American Monsoon. Reports to the Nation on our Changing Planet. NOAA/National Weather Service. Available on line at: http://www.cpc.noaa.gov/products/outreach/Report-to-the-Nation-Monsoon_aug04.pdf

result in a significant monsoon "break". However, if the ridge sets up in a few key locations, widespread and potentially severe thunderstorms can develop.

In Imperial County, isolated thunderstorms begin to develop, mainly during the hottest part of the day. Because the upper level steering pattern and disturbances around the ridge are critical for influencing where thunderstorms develop on any given day when lower levels of the atmosphere remain dry causing most of the rain not to reach the ground the creation of strong, gusty and highly variable winds occurs. On occasion, a few of these thunderstorms are pushed by the winds into the lower deserts during the evening hours.

II.3 Event Day Summary

The exceptional event for June 30, 2015, caused when an early-season monsoonal event with a large disturbance made its way from the southeast to northwest through western Arizona and southern California from Mexico. The monsoonal event brought a significant amount of mid-level moisture and unsettled weather to the San Diego region, Riverside, Los Angeles and southwestern Arizona. On June 30, 2015, gusty south winds, associated with a large intrusion of unstable monsoonal air, transported fugitive dust emissions from areas as far south as northeastern Mexico. The large intrusion of unstable monsoonal air surrounded Imperial County creating brief periods of rain and sufficient gusty winds transporting fugitive dust causing an exceedance at the Niland monitor.[9]

Figures 2-18 through 2-22 provide information regarding the expected movement of the monsoonal event, including the arrival of the cloud cover supporting the direction of the event, the pressure gradients and wind speeds. Generally, the monsoonal event moved from the south to the north where surface and atmospheric conditions caused thunderstorms, lighting and rain along the coastal areas in California and Phoenix while isolating Imperial County from the more dramatic thunderstorm activities. Winds were significant within the higher elevations of San Diego County and on the eastern edge of Imperial County, primarily along the Arizona/California border. This is significant as it helps to explain why Niland was the only air monitor to exceed the NAAQS on June 30, 2015.

[9] Area Forecast Discussion National Weather Service San Diego CA 807 AM PST (907 AM PDT); 114 PM PST (214 PM PDT); 830 PM PST (930 PM PDT) and Phoenix AZ 912 AM PST (1012 AM PDT) Tuesday, June 30, 2015

FIGURE 2-18
FORECAST MODEL FOR JUNE 30, 2015

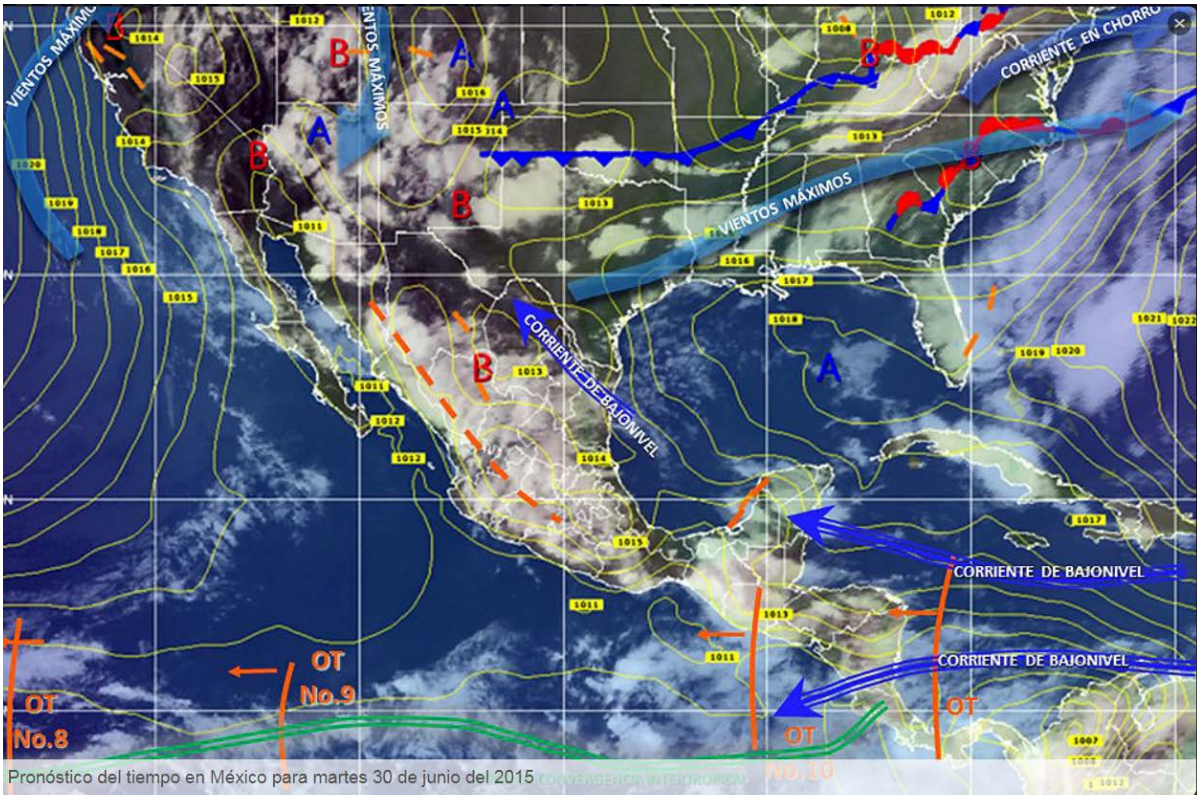


Fig 2-18: A forecast model for June 30, 2015 issued by e-consulta.com in Oaxaca Mexico. The article found in **Appendix A** describes a low-pressure channel located southwest of the Gulf of Mexico over the northeast. The article explains that humidity from the Pacific Ocean and the Gulf of Mexico combined with the low-pressure created favorable conditions for the potential for strong rain, electrical thunderstorms and high gusty winds throughout Mexico including Baja California. The forecast model illustrates the path and expected low-pressure (B) position over southeastern California near the Nevada and Arizona borders. Note the estimated proximity of the high pressure with the low pressure. Image courtesy of e-consulta.com Oaxaca

FIGURE 2-19
SURFACE ANALYSIS JUNE 30, 2015

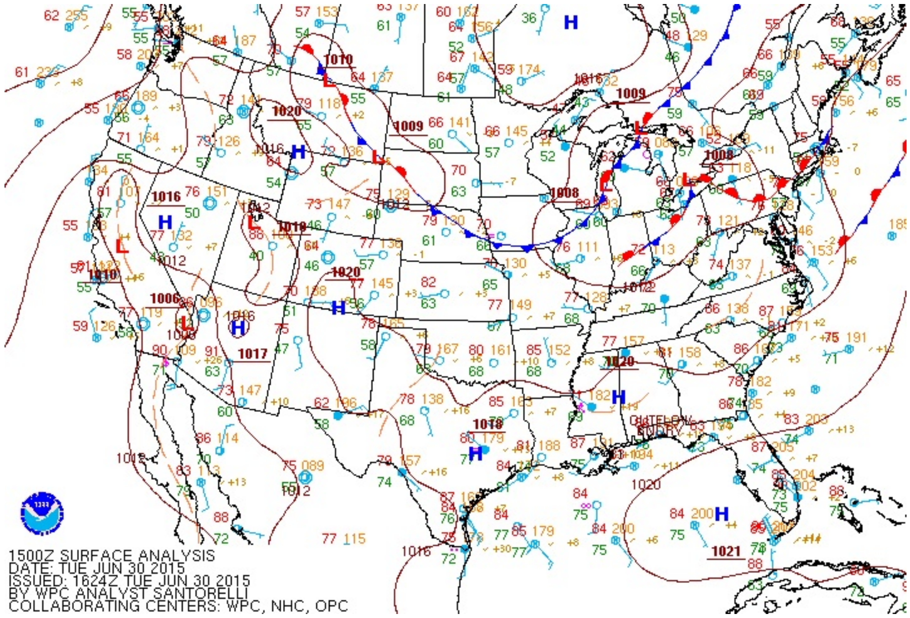


Fig 2-19: A surface analysis map (824 PST) illustrating the position of the lows and highs along California, Nevada and Arizona. The alignment, a northwest southeast direction helped direct the monsoonal system over southeastern California and southwestern Arizona. The relative position of the low with the high pressure created ideal conditions whereby the winds associated with the monsoonal system took a northeast northwest tract that led to the Niland station. Weather Prediction Center Surface Analysis Archives; http://www.wpc.ncep.noaa.gov/archives

FIGURE 2-20
GOES-W VISIBLE INFRARED SATELLITE IMAGES JUNE 30, 2015

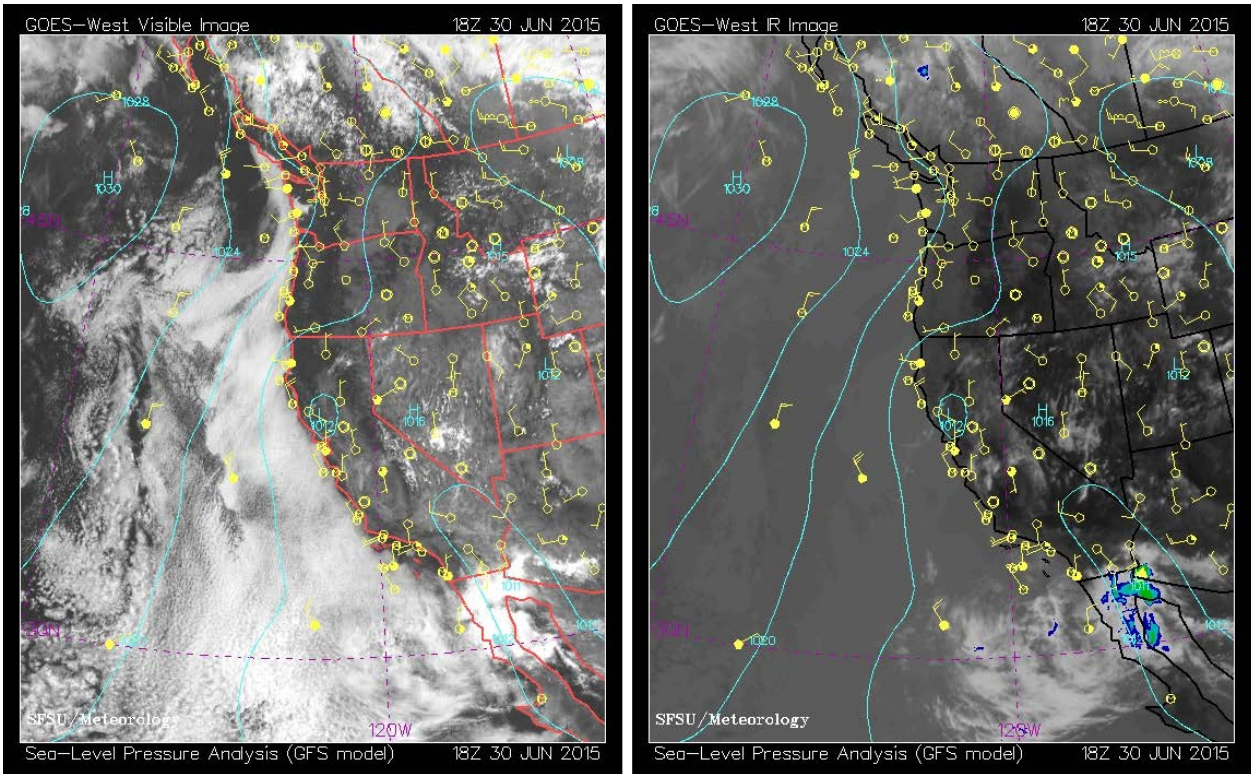


Fig 2-20: A pair of sea-level pressure composite analysis maps captured by a GOES-W satellite at 1000 PST on June 30, 2015. The visible (left) and infrared (right) images show the monsoonal weather system extending upwards from Mexico into southeastern California. Wind barbs over southeastern California indicate moderately strong winds (~23 mph) from the south-southeast. Images courtesy of SFSU Department of Earth and Climate Sciences and the California Regional Weather Server

FIGURE 2-21
CONUS INFRARED IMAGE JUNE 30, 2015

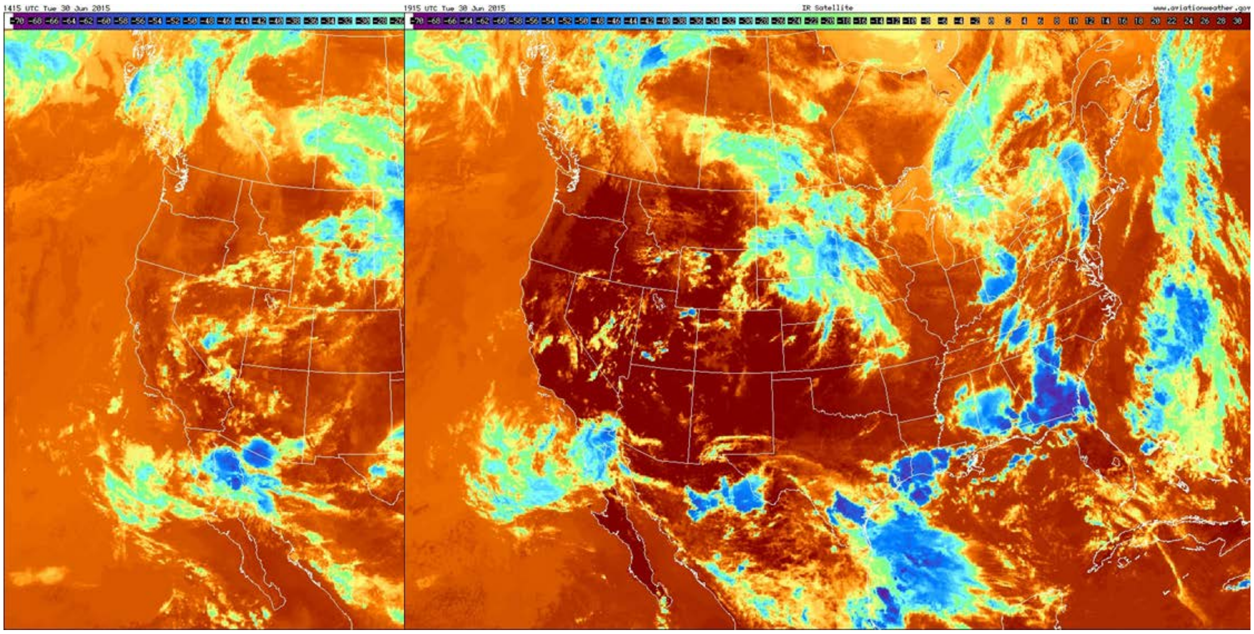


Fig 2-21: CONUS infrared satellite images captured at 0615 am PST (left) and 1115 am PST (right). Both images provide not only the continental United States as it correlates to temperature but the images also captured the clouds associated with the monsoonal system that intruded into southern California and Arizona on June 30, 2015. See explanation below. Image courtesy of Aviationweather.gov http://www2.mmm.ucar.ed

Typically, clouds that are very high in the atmosphere are cold (blue) while clouds closer to the surface are warmer (lighter colors). Hotter surface temperatures and cooler sinking air can produce a “break” in the monsoon system preventing thunderstorms from developing in small areas. However, as explained above although thunderstorms may not develop during these “breaks”, strong gusty and highly variable winds do occur. **Figures 2-18 to 2-21** provide some information that such a break occurred in Imperial County and parts of Yuma County on June 30, 2015. News articles from the San Diego Union Tribune, Fox 5 news, and ZachNews among others describe thunderstorm activity, lightning strikes, rain and high winds in San Diego County, Riverside County (including Blythe), Los Angeles County, and Phoenix on June 30, 2015. The San Diego NWS office released a Special Weather Statement at 1138 am PST identifying the movement of a strong thunderstorm near Campo, California. Finally, the local Imperial Valley Press (IV Press) published a “Significant weather advisory for southern Imperial County” supporting the meteorological observation of a monsoonal break in Imperial County. The IV Press advisory (**Appendix A**) issued at 1101 am PST identified a strong thunderstorm near Gordon Wells or 20 miles northwest of Gadsden, Arizona moving west at 40 mph (**Figure 2-22**). Preceding this advisory the Phoenix NWS office issued at 0956 am PST a Significant Weather Statement which identified the tracking of the same thunderstorm 11 miles east of San Luis moving northwest at 35 mph. As the monsoonal system moved north, preceding winds were increasing as the associated thunderstorms headed towards Imperial County.

FIGURE 2-22
LOCATION OF GORDON WELLS RV AND GADSDEN

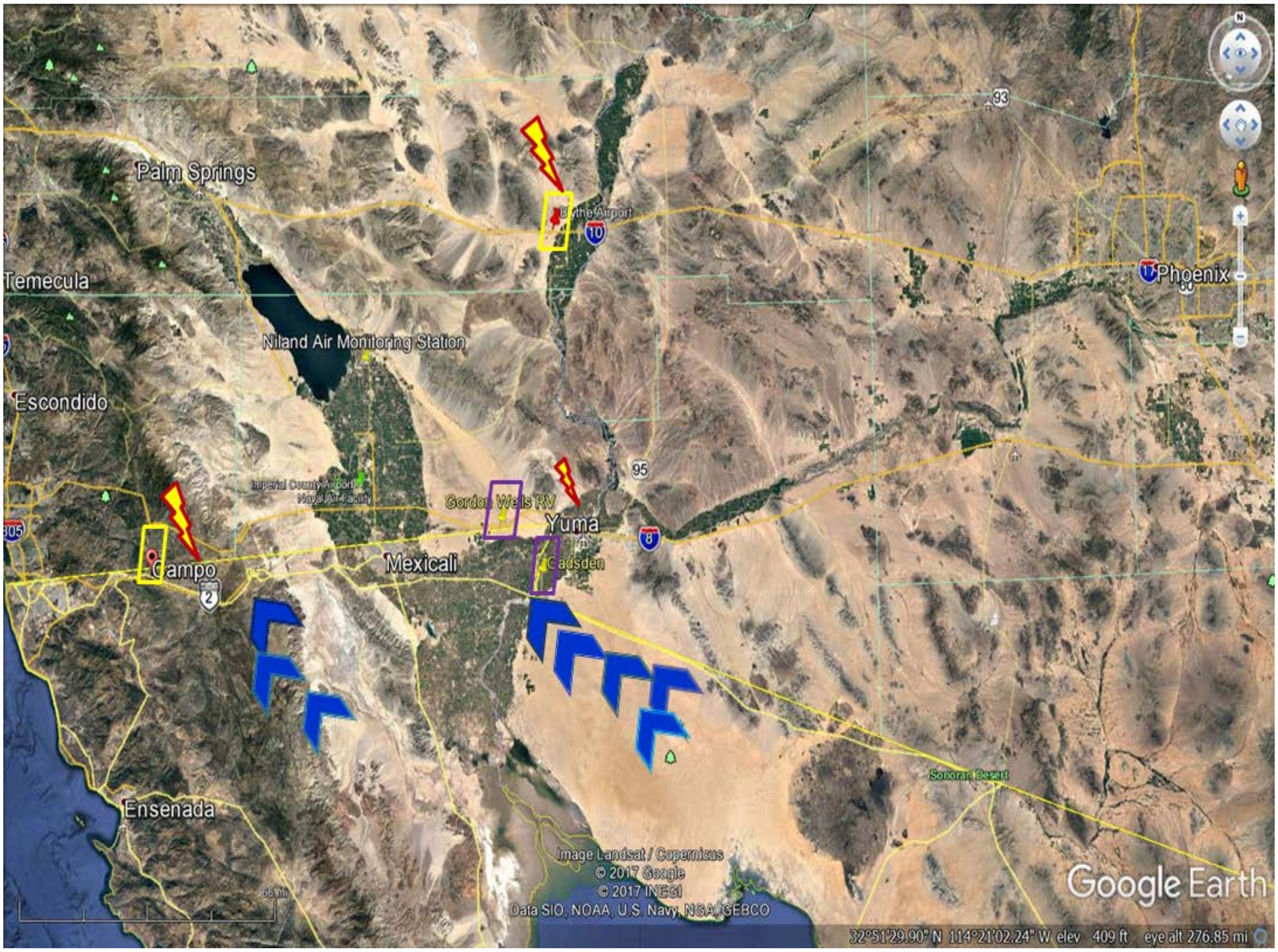


Fig 2-22: The google earth image depicts the location of Campo, Blythe, Gordon Wells RV and Gadsden. The yellow rectangles denote Campo and Blythe. The purple rectangles denote Gordon Wells RV and Gadsden. Gadsden is located within Yuma County while Gordon Wells RV is located within Imperial County. The NWS Special Weather Statement issued at 1101 am PST (published by the IV Press) identified a strong thunderstorm near Gordon Wells and Gadsden on June 30, 2015

FIGURE 2-23
MODIS TERRA SATELLITE IMAGE

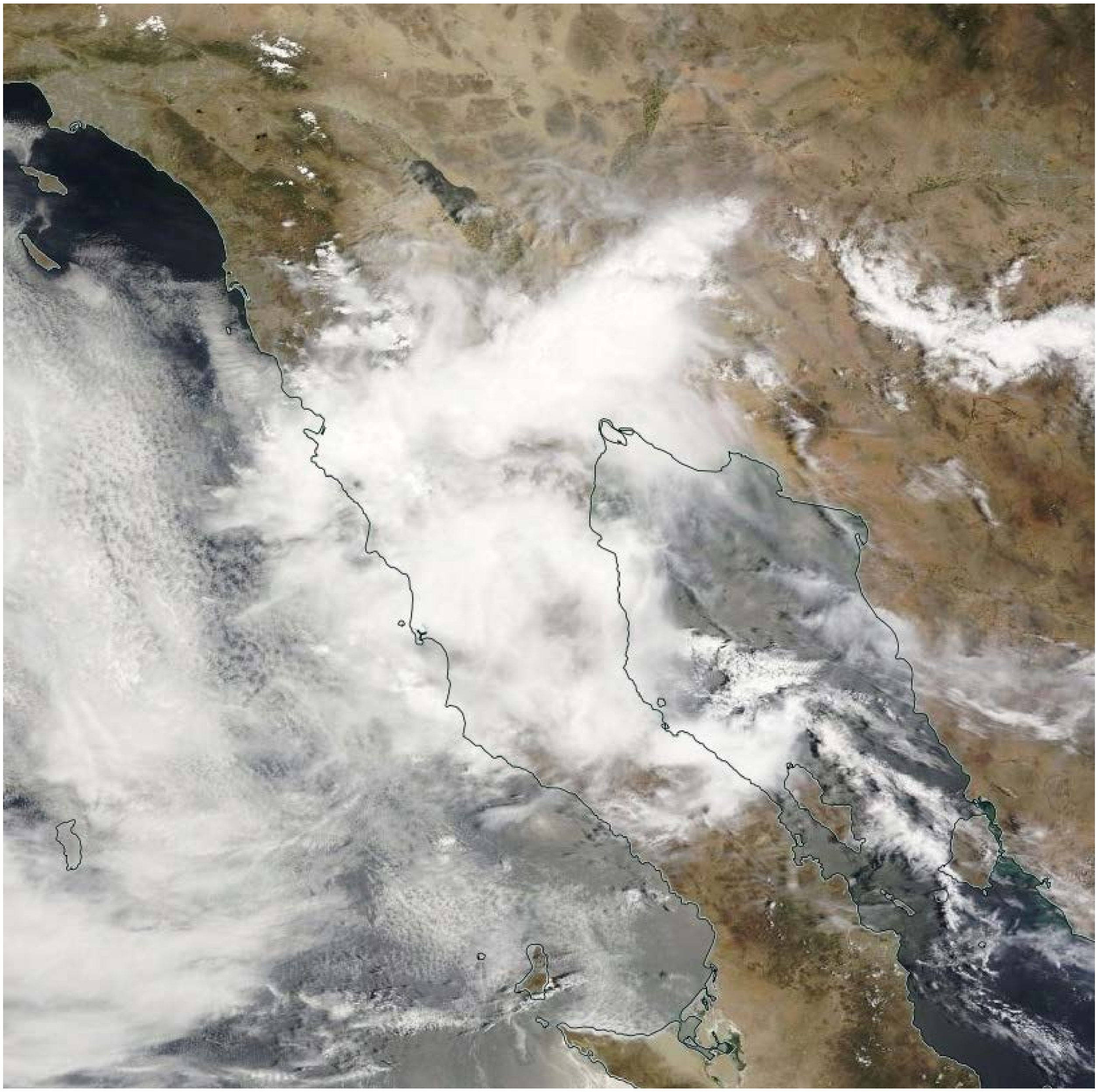


Fig 2-23: A Terra MODIS satellite image captured the clouds associated with the monsoonal system demonstrating the movement northward from Mexico into southeastern California and western Arizona. Outflow boundaries ahead of the large intrusion of monsoonal air created gusty outflow winds that entrained dust. Clouds obscure the source area for the dust in northern Mexico along the southeastern corner of Imperial County. Image courtesy of AirNow Tech Navigator

The ramp up analysis identified a predominantly southerly wind direction with variability east to west throughout the day. The monsoonal system brought lightening, rain and high winds to areas to the west, east and north of Imperial County. **Tables 2-2 and 2-3** provide a perspective on wind direction, which played a significant role along with topography in the exceedance at Niland and the non-exceedance at Brawley. The meteorological observations indicate that airports measured primarily a southerly wind direction with am hours predominantly from the southeast while afternoon hours predominantly from the southwest. Similarly, other stations measured predominantly a southerly wind direction with variability between an east and west direction. This variability created by the existing topography to the east of the Niland station and would have prevented any significant impact to stations located further west, such as Brawley.

TABLE 2-2
WIND DIRECTION FOR LOCAL AIRPORTS AND NILAND

CAMPO (CPOSD)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			BLYTHE AIRPORT (KBLH)			NILAND				NILAND BAM	BRAWLEY BAM
HOUR	W/D		HOUR	W/D		HOUR	W/D		HOUR	W/D		HOUR	W/D		HOUR	PM_{10} (µg/m³)	PM_{10} (µg/m³)
52	10	N	56	90	E	53	120	ESE	52	200	SSW	0	106	ESE	0	31	34
152	0	N	156	150	SSE	153	150	SSE	152	190	S	100	110	ESE	100	26	22
252	60	ENE	256	100	E	253	110	ESE	252	180	S	200	107	ESE	200	28	24
352	50	ENE	356	40	NE	353	120	ESE	352	180	S	300	104	ESE	300	22	32
452	40	NE	456	100	E	453	100	ESE	452	170	S	400	134	SE	400	41	21
552	0	N	556	110	ESE	553	110	ESE	552	180	S	500	137	SE	500	50	34
652	0	N	656	120	ESE	653	140	SE	652	180	S	600	139	SE	600	116	58
752	0	N	756	140	SE	753	140	SE	752	180	S	700	143	SE	700	130	151
852	200	SSW	856	150	SSE	853	180	S	852	180	S	800	141	SE	800	110	145
952	VR		956	170	S	953	180	S	952	170	S	900	141	SE	900	448	
1052	190	S	1038 1056	120 130	ESE SE	1053	150	SSE	1052	180	S	1000	150	SSE	1000	992	127
1152	180	S	1156	80	E	1153	230	SW	1150 1152	190 190	S S	1100	160	SSE	1100	992	697
1252	350	N	1256	210	SSW	1253	230	SW	1201 1252	200 240	SSW WSW	1200	239	WSW	1200	406	126
1352	VR		1356	250	WSW	1353	150	SSE	1352	240	WSW	1300	265	W	1300	292	62
1452	340	NNW	1456	220	SW	1453	0	N	1452	210	SSW	1400	209	SSW	1400	210	73
1552	310	NW	1556	160	SSE	1553	240	SW	1552	220	SW	1500	186	S	1500	91	32
1652	0	N	1656	VR		1653	250	WSW	1652	240	WSW	1600	185	S	1600	79	21
1752	250	WSW	1756	170	S	1753	250	WSW	1752	230	SW	1700	181	S	1700	23	20
1852	200	SSW	1856	130	SE	1853	170	S	1852	230	SW	1800	158	SSE	1800	84	34
1952	200	SSW	1956	150	SSE	1953	140	SE	1952	210	SSW	1900	121	ESE	1900	44	101
2052	0	N	2056	120	ESE	2053	150	SSE	2052	180	S	2000	119	ESE	2000	51	62
2152	0	N	2156	190	S	2153	160	SSE	2119 2128 2143 2150 2152	190 210 190 190 190	S SSW S S S	2100	112	ESE	2100	40	39
2252	30	NNE	2256	190	S	2253	180	S	2252	160	SSE	2200	143	SE	2200	44	52
2352	0	N	2356	130	SE	2353	160	SSE	2352	180	S	2300	120	ESE	2300	58	69

TABLE 2-3
WIND DIRECTION FOR SITES LOCATED TO THE EAST OF NILAND

YUMA MCAS (KNYL)			BUTTERCUP RANGER STATION (BTTC1)			CACTUS (UP589)			CAHUILLA RANGER STATION (BTTC1)				NILAND	BRAWLEY
HOUR	W/D		HOUR	W/D		HOUR	W/D		HOUR	W/D		HOUR	PM10 (μg/m³)	
2357	200	SSW	2309	106	E	2300			2310	109	ESE	2300	42	44
057	180	S	009	173	S	015	207	SSW	010	134	SE	000	31	34
157	170	S	109			100			110	77	ENE	100	26	22
257	160	SSE	209	60	E	240	132	SE	210	90	E	200	28	24
357	140	SE	309	109	ESE	300			310	70	ENE	300	22	32
457	160	SSE	409	112	ESE	410	176	S	410	63	ENE	400	41	21
			509	110	ESE	515	184	SSW	510	95	E	500	50	34
554	150	SSE				525	196	SSW						
557	150	SE				550	181	S						
657	170	S	609	127	SE	610	197	SSW	610	113	ESE	600	116	58
757	170	S	709	161	SSE	740	222	SW	710	136	SE	700	130	151
857	180	S	809	166	SSE	830	207	SSW	810	147	SSE	800	110	145
924	180	S	909	179	S	910	235	SW	910	152	SSE	900	448	
932	170	S				925	233	SSW						
939	170	S												
947	170	S				945	228	SW						
957	170	S				950	233	SW						
1014	210	SSW	1009	169	SSE				1010	155	SSE	1000	992	127
1024	210	SSW												
1044	290	WNW				1030	242	WSW						
1053	260	W												
1054	250	WSW				1050	236	SW						
1102	210	SSW	1109	271	W				1110	169	SSE	1100	992	697
1114	180	S												
1157	200	SSW				1150	240	SW						
1257	No Data		1209	194	SSW	1240	216	SSW	1210	249	WSW	1200	406	126
No Data			1309	170	S	1325	210	SSW	1310	142	SE	1300	292	62
			1409	157	SSE	1400	227	SW	1410	154	SSE	1400	210	73
			1509	209	SSW	1525	240	WSW	1510	174	S	1500	91	32
			1609	215	SSW	1605	264	W	1610	210	SSW	1600	79	21
						1635	220	SW						
			1709	215	SW	1705	315	NW	1710	243	WSW	1700	23	20
						1725	347	NNW						
			1809	237	SW	1800			1810	255	WSW	1800	84	34
			1909	208	SSW	1915	238	SSW	1910	229	SW	1900	44	101
			2009			2030	235	SW	2010	184	S	2000	51	62
			2109	200	SSW	2105	263	W	2110	135	SE	2100	40	39
			2209	193	SSW	2220	236	WSW	2210	148	SSE	2200	44	52
			2309	165	SSE	2315	225	SW	2310	139	SE	2300	58	69
						2335	209	SSW						

The chain of events illustrated in **Figure 2-14** provides an overall picture. Winds primarily remained in the teens with spikes during the early morning hours. The Bylthe airport, the Yuma MCAS, the Cactus station and the Cahuilla station measured at least one hour of 25mph or higher during the early morning hours. However, because of the variability of the wind direction wind speeds remained moderate with measured gusts at the Blythe Airport, the Yuma MCAS, and those stations located to the east of Niland. Measured gusts east of Niland would account for the entrained dust to the monitor as moderate level winds blew into Imperial County see **Tables 5-1 and 5-2.** All the stations to the east of Niland measured elevated gusts 11mph to 40mph during the morning hours of June 30, 2015 coincident with the hourly-elevated concentrations at the Niland monitor. By late afternoon to evening hours, as the monsoonal system moved northward the Niland hourly PM_{10} levels returned to moderate levels.

FIGURE 2-24
RAMP UP ANALYSIS JUNE 30, 2015

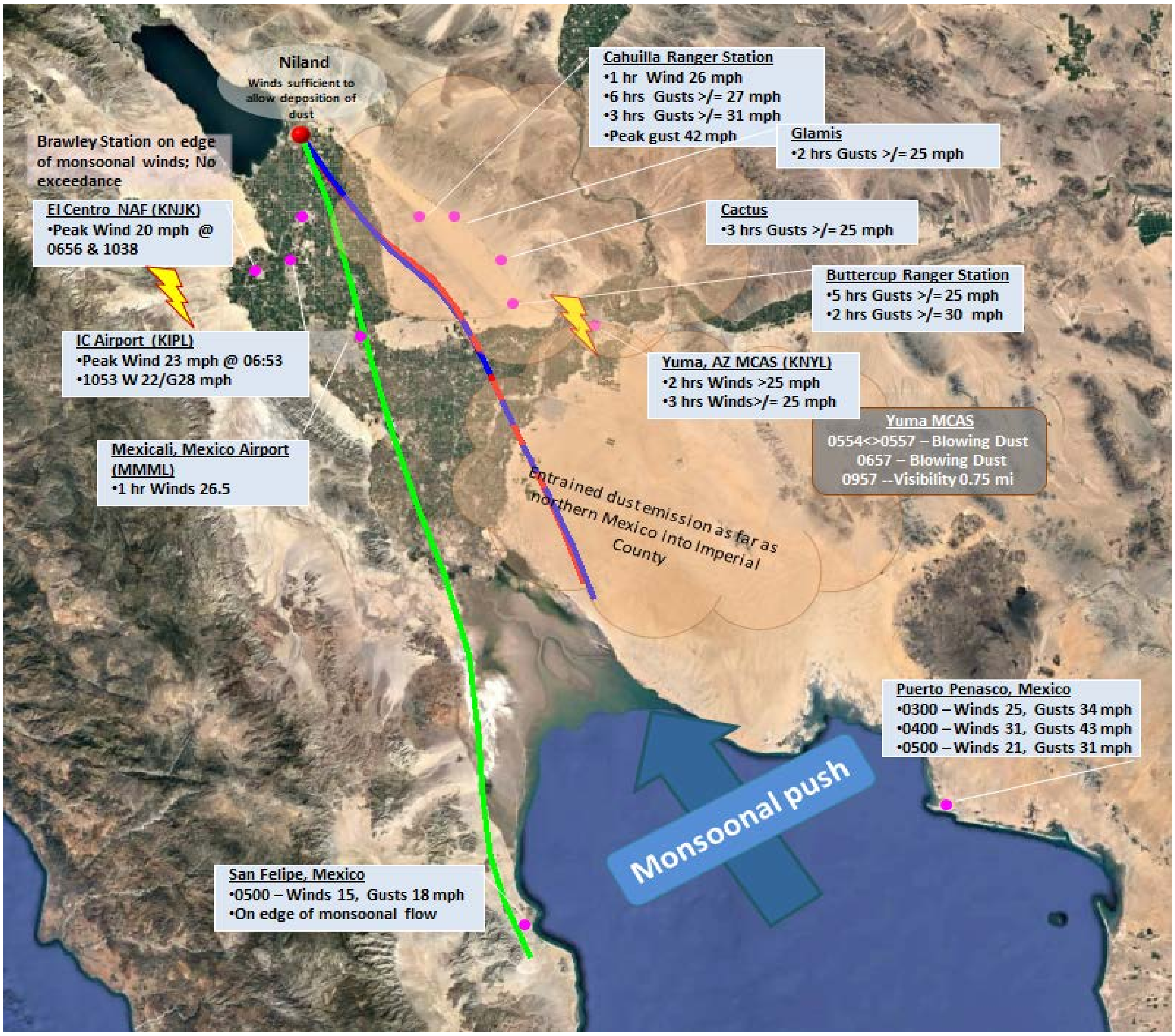


Fig 2-24: The ramp-up to the exceedance measured at the Niland monitor was a result of winds associated with a monsoonal flow. A burst of strong winds from generally the southeast starting about 0600 swept through the Imperial Valley from the dry, desert areas of northern Mexico

Table 2-4 contains a summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali. For detailed meteorological station, graphs see **Appendix B**.

TABLE 2-4
WIND SPEEDS ON JUNE 30, 2015

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM_{10} correlated to time of Max Wind Speed Niland
IMPERIAL COUNTY						
Imperial Airport (KIPL)	23	140	653	28	1053	116
Naval Air Facility (KNJK)	20	120	656	-	-	116
Calexico (Ethel St)	15.2	132	1000	-	-	992
El Centro (9th Street)	8.4	267	700	-	-	130
Niland (English Rd)	21.9	249	1800	-	-	84
Westmorland	14.9	160	1100	-	-	992
RIVERSIDE COUNTY						
Blythe Airport (KBLH)	25	180	852/0952	34	1052/1152	110/448
Palm Springs Airport (KPSP)	18	160	1100	-	-	992
Jacqueline Cochran Regional Airport (KTRM) - Thermal	16	160	1100	-	-	992
ARIZONA - YUMA						
Yuma MCAS (KNYL)	30	150	554	40	957	448
MEXICALI - MEXICO						
Mexicali Int. Airport (MXL)	26.5	130	1100	-	-	992

National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back trajectory model[10] **(Figure 2-15**), indicate the path of air flow in the 12 hours leading up to the exceedance at Niland.

The monsoonal system moved northward from Mexico over the open desert areas located to the southeast and southwest of Imperial County. Although surface wind speeds in Imperial County were moderate to high the wind direction and path of the monsoonal system played a significant role in the exceedance at the Niland station. By far, the monsoonal system took two paths. One over the eastern northern section of Mexico and one over the Baja peninsula up through the mountains and coastal areas in San Diego. The HYSPLIT (left image) model confirms that air flow from the western section did not contact the surface area or desert areas as did the air flow at 10 meters (red trajectory) and air flow at 100 meters (blue trajectory). Starting shortly after 1200Z (0400 PST), air flow at 100 meters rose from entrainment level to transport level, thus enabling entrained soils to be transported downstream to Niland. It should be noted that modeled winds can differ from local conditions. Data used in the HYSPLIT model has a horizontal

[10] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology.

resolution of 12 km and is integrated every three hours. Thus, the HYSPLIT model may differ from local observed surface wind speeds and directions.

FIGURE 2-25
HYSPLIT MODEL

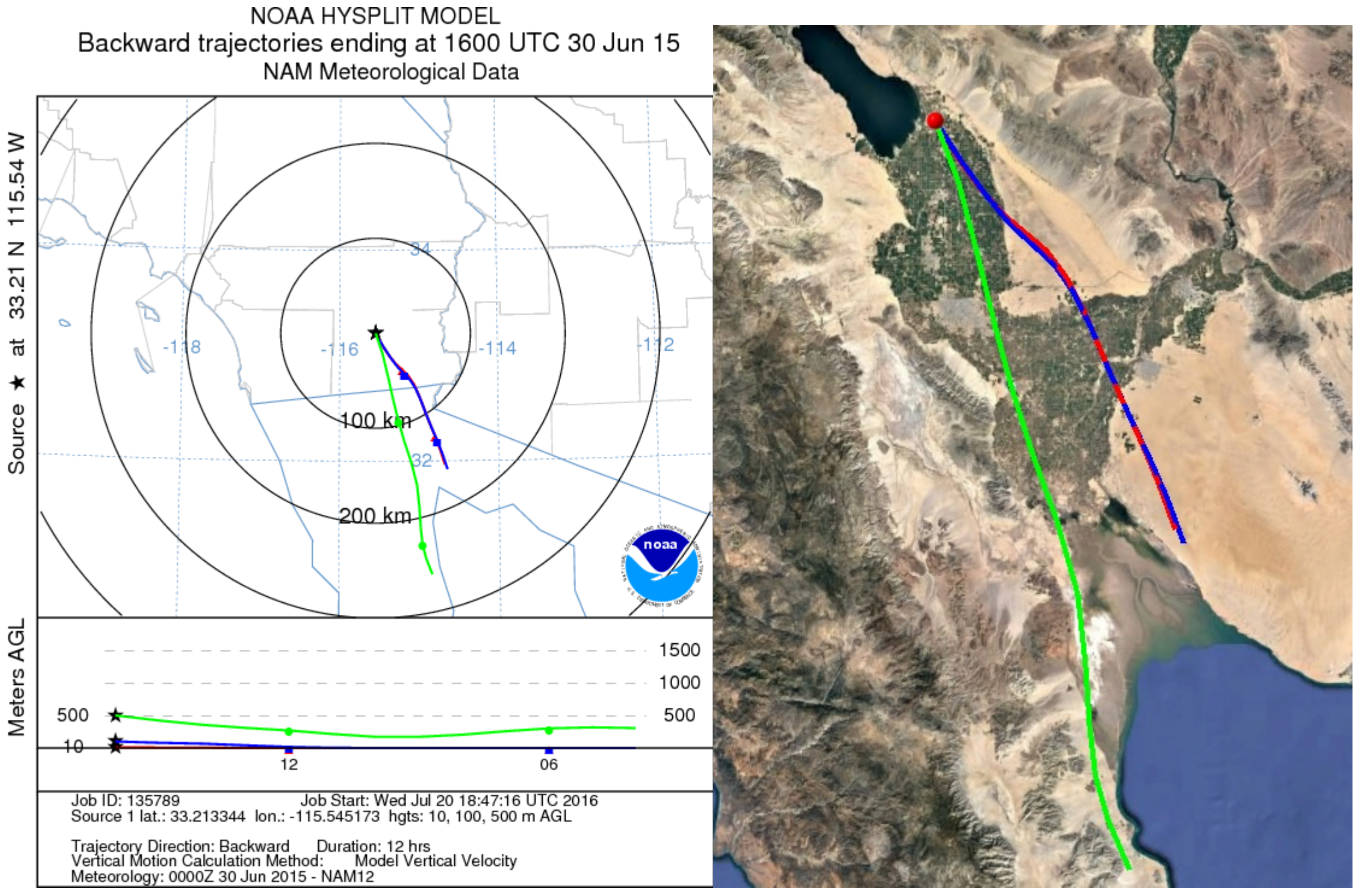


Fig 2-25: A 12-hour back trajectory HYSPLIT ending at Niland on June 30, 2015 at 0800 PST. This is at the hour that Niland experienced the first dramatic spike in PM_{10} concentrations. Airflow is coming from a south-southeast direction over the dry soils of the Sonoran Desert in Mexico and southeastern Imperial County. Red lines depict airflow at the 10-meter AGL (above ground level); blue depicts airflow at 100 meters AGL; green depicts airflow at 500 meters AGL. Left image is the same trajectory with a base map. Dynamically generated through NOAA's Air Resources Laboratory

Figure 2-26 illustrates the elevated levels of PM_{10} concentrations measured in Riverside, Imperial, and Yuma counties for a total of three days June 29, 2015 through July 1, 2015. The Niland monitor measured the highest elevated concentrations between 0600 PST and 1400 PST coincident with continual measured wind gusts at sites east of the Niland monitor. Although winds speeds remained moderate stations to the east of Niland measured at least one hour of 24mph or higher.

The resulting entrained dust and accompanying winds, particularly wind gusts from the system qualify this event as a "high wind dust event".[11] High wind dust events are considered natural events where the windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the June 30, 2015 high wind event qualifies as a natural event and that BACM was overwhelmed by the suddenness and intensity of the meteorological event.

FIGURE 2-26
72 HOUR PM_{10} CONCENTRATIONS NEIGHBORING SITES

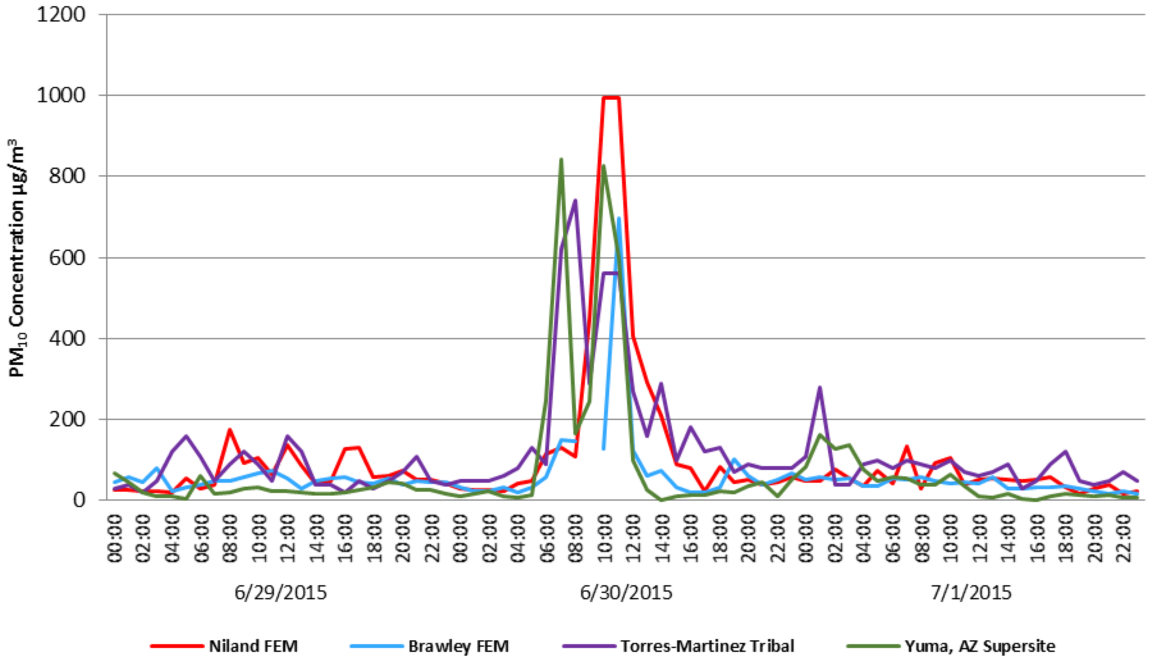


Fig 2-26: Is the graphical representation of the 72-hour PM_{10} concentrations at various monitoring locations throughout Riverside, Imperial and Yuma counties. The elevation of PM_{10} concentrations clearly demonstrates that all sites were impacted by the weather system and accompanying winds. Yuma is MST. Air quality data from the EPA's AQS data bank

[11] Title 40 Code of Federal Regulations part 50: §50.1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

III Historical Concentrations

III.1 Analysis

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM_{10} concentrations measured at the Niland monitor on June 30, 2015, compared to non-event and event days demonstrates the variability over several years and seasons. The analysis also provides supporting evidence that there exists a clear causal relationship between the June 30, 2015 high wind event and the exceedance measured at the Niland monitor.

Figures 3-1 and 3-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Niland monitor for the period of January 1, 2010 through June 30, 2015. Note that prior to 2013, BAM data was not FEM therefore, not reported into AQS.[12] Properly establishing the variability of the event as it occurred on June 30, 2015, 24-hour averaged PM_{10} concentrations between January 1, 2010 and June 30, 2015 were compiled and plotted as a time series. All figures illustrate that the exceedance, which occurred on June 30, 2015, were outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

[12] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

FIGURE 3-1
NILAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JUNE 30, 2015

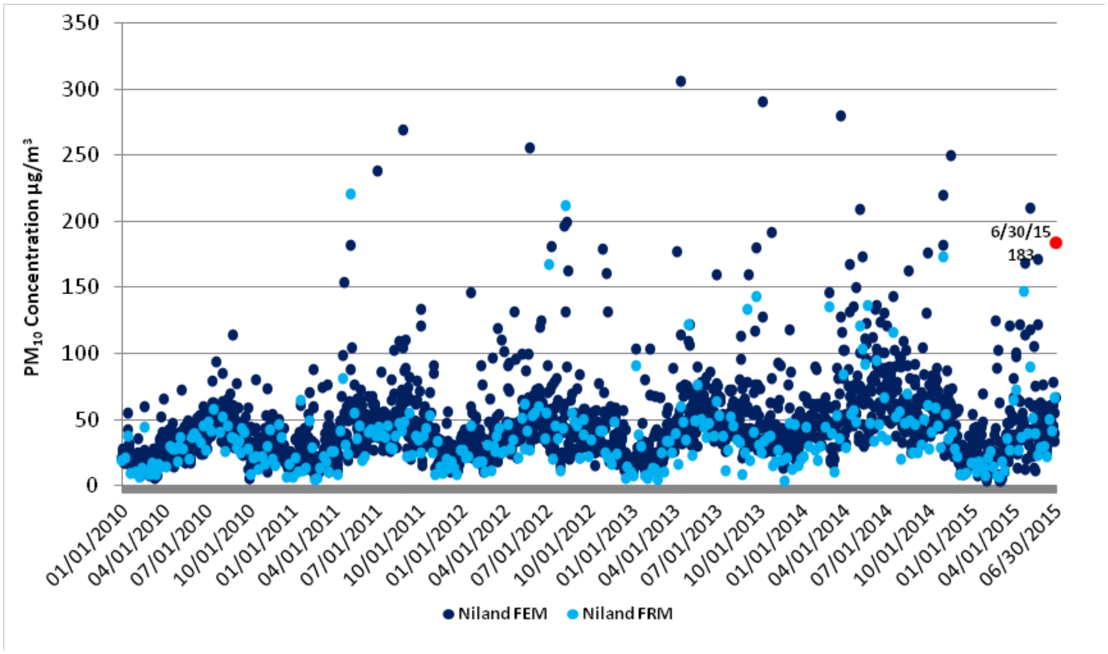
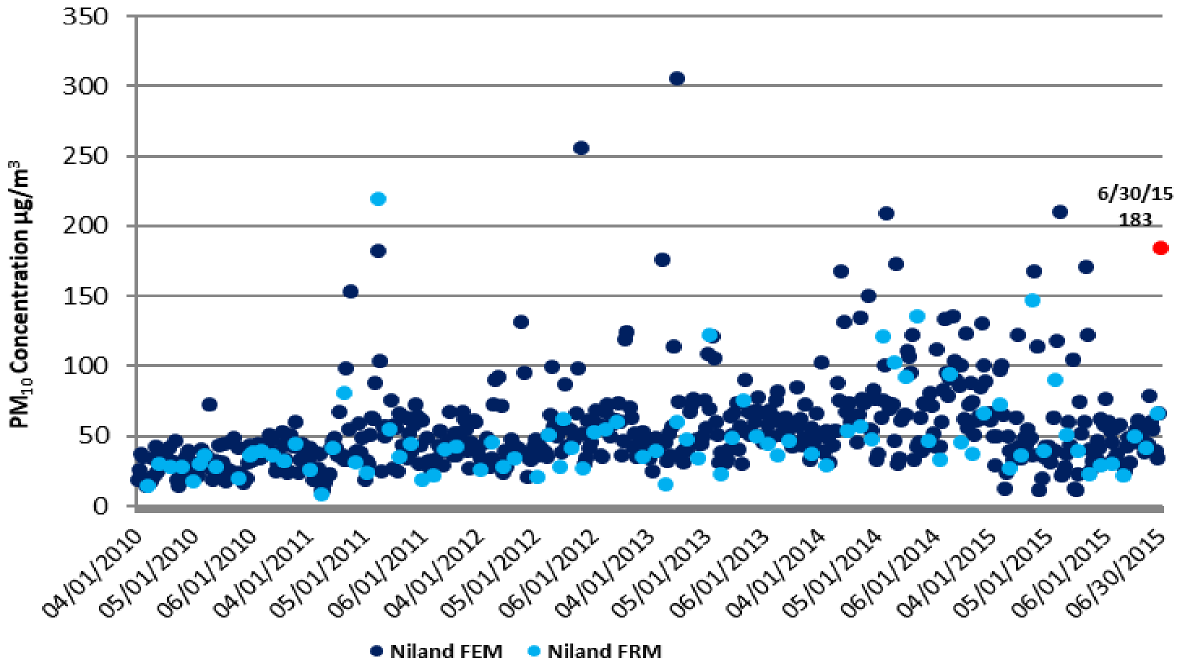


Fig 3-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 183 µg/m³ on June 30, 2015 by the Niland monitor was outside the normal historical concentrations when compared to similar event days and non-event days. Of the 2007 sampling days there were 33 exceedance days which is less than a 2.0% occurrence rate

The time series, **Figures 3-1 thru 3-2** for Niland included 2,321 credible samples measured between January 1, 2010 and June 30, 2015 or a total 2007 sampling days.

Overall, the time series illustrates that the Niland monitor, measured 33 exceedance days out of the 2,007 sampling days, which is less than a 2% occurrence rate. Of the 33 exceedance days, 13 exceedance days occurred during the second quarter (April – June). The remaining 20 exceedance days occurred during the first, third and fourth quarters. The June 30, 2015 concentration is outside the normal historical measurements for the second quarter. No exceedances of the standard occurred during 2010. As mentioned above, FEM BAM data was not regulatory from 2010 to 2012.

FIGURE 3-2
NILAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
***APRIL 1, 2010 THROUGH JUNE 15, 2015**



***Quarterly: April 1, 2010 through June 30, 2014 and April 1, 2015 through June 15, 2015**

Fig 3-2: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 183 µg/m^3 by the Niland monitor on June 30, 2015 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 3-2 displays the seasonal fluctuation over 546 sampling days at the Niland monitor for second quarter (April to June) between 2010 and 2015. The Niland monitor measured 631 credible samples over 546 sampling days. Of the 546 sampling days, there were 13 measured exceedance days, which equates to less than a 2.5% occurrence rate. The June 30, 2015 measured concentration at the Niland monitor was outside the normal historical and seasonal concentrations when compared to both event days and non-event days.

FIGURE 3-3
NILAND HISTORICAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JUNE 30, 2015

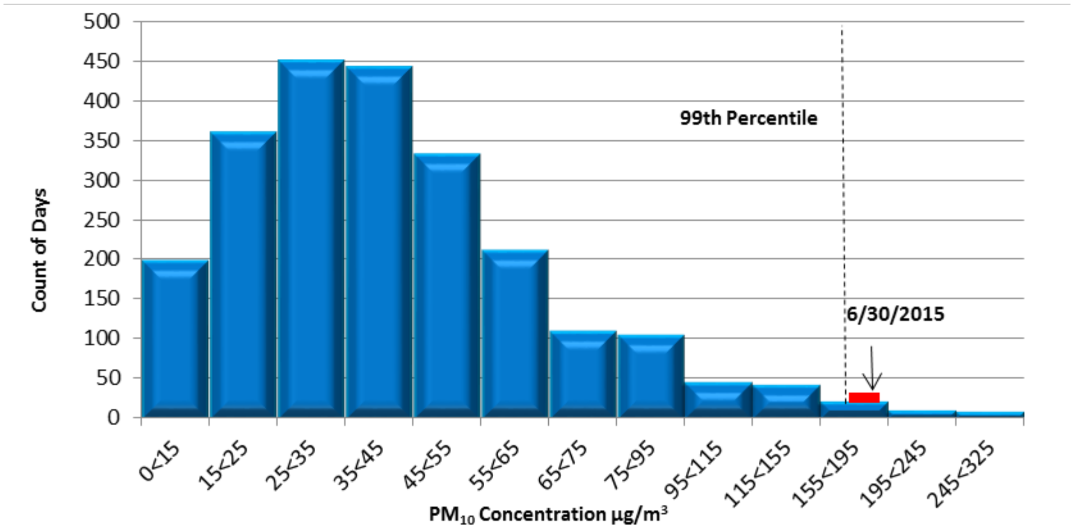
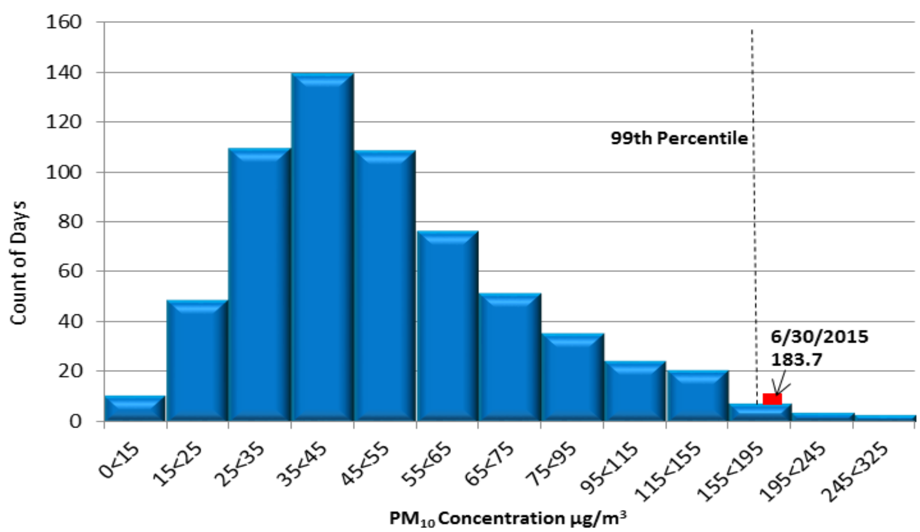


Fig 3-3: The 24-hr average PM_{10} concentrations measured at the Niland monitor demonstrates that the June 30, 2015 event was in excess of the 99th percentile

FIGURE 3-4
NILAND SEASONAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
***APRIL 1, 2010 THROUGH JUNE 15, 2015**



*April 1, 2010 through June 30, 2014 and April 1, 2015 to June 15, 2015

Fig 3-4: The 24-hr average PM_{10} concentration at the Niland monitor demonstrates that the June 30, 2015 event was in excess of the 99th percentile

For the combined FRM and FEM data sets for the Niland monitor the annual historical and the seasonal historical PM_{10} concentration of 183 µg/m^3 both are above the 99th percentile rank. Looking at the annual time series concentrations, the seasonal time series concentrations and the percentile rankings for both the historical and seasonal patterns the June 30, 2015 measured exceedance is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plots, seasonal time series plots, and the percentile rankings illustrate that the PM_{10} concentration observed on June 30, 2015 occurs infrequently. When comparing the measured PM_{10} level on June 30, 2015 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedance measured at the Niland monitor was outside the normal historical and seasonal historical concentration levels.

The historical concentration analysis provided here supports the determination that the June 30, 2015 natural event affected the concentrations levels at the Niland monitor causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedance on June 30, 2015 and the natural event, qualifying the natural event as an Exceptional Event.

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the "not reasonably controllable or preventable" (nRCP) criterion as two prongs. To address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures to consider the measures as enforceable. USEPA considers control measures enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for "high wind events" when PM_{10} concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a "natural event" where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for June 30, 2015. In addition, this June 30, 2015 demonstration provides technical and non-technical evidence that a monsoonal system moved into the southwestern portion of the United States from Mexico. Existing meteorological conditions, hot surface temperatures and cooler sinking air caused a "break" in the monsoonal system preventing thunderstorms, which were evident in San Diego County, Riverside County and Phoenix Arizona, from developing in Imperial County. Although Imperial County did not experience thunderstorm activity it did experience predominantly southerly winds with variable east to west gusty winds. These gusty winds, entrained fugitive emissions from the northern deserts in Mexico into southeastern California and into Imperial County affecting the Niland monitor on June 30, 2015. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the June 30, 2015 EE.

IV.1 Background

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State

Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 4-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

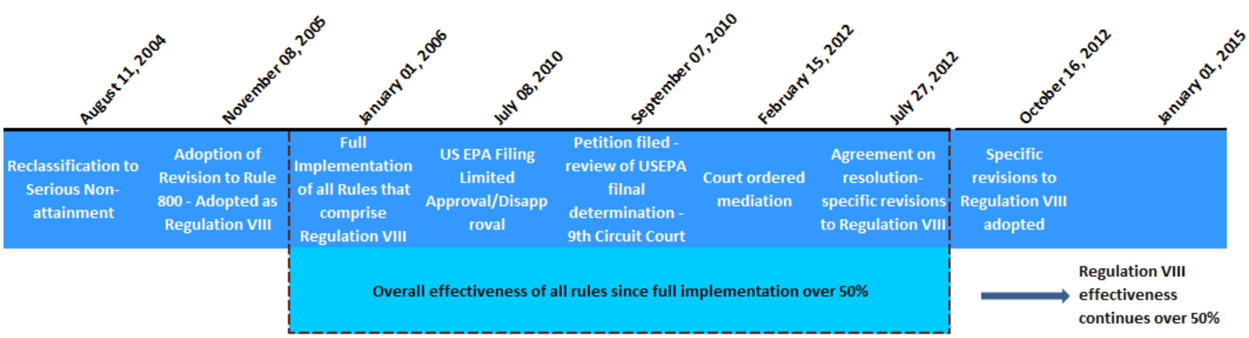


Fig 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

Below is a brief summary of Regulation VIII, which is comprised of seven fugitive dust rules. **Appendix D** contains a complete set of the Regulation VIII rules.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B of Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generate dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews hourly surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four-quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. On June 30, 2015 the ICAPCD declared a "Marginal Green Waste Only" burn day **(Appendix A).** No complaints were filed for agricultural burning on June 30, 2015.

IV.1.c Review of Source Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Niland during the June 30, 2015 PM_{10} exceedance. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. There were no complaints filed on June 30, 2015, officially declared a "Marginal Green Waste Only" burn day, related to agricultural burning, waste burning or dust.

FIGURE 4-2
PERMITTED SOURCES

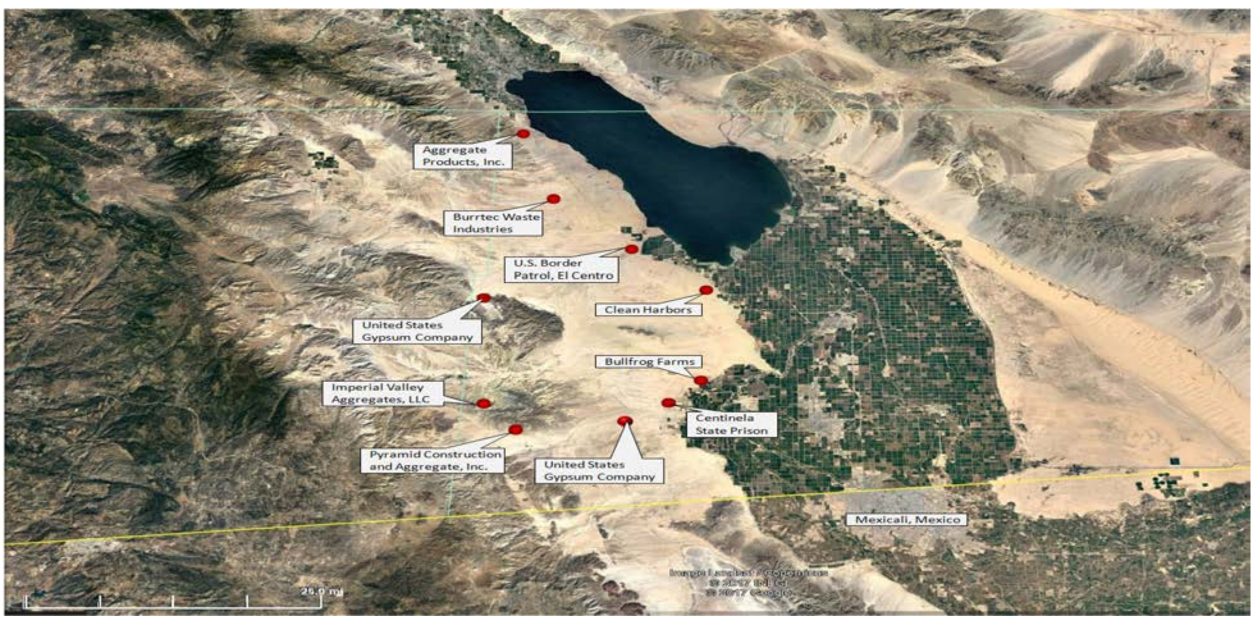


Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Niland monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

FIGURE 4-3
NON-PERMITTED SOURCES

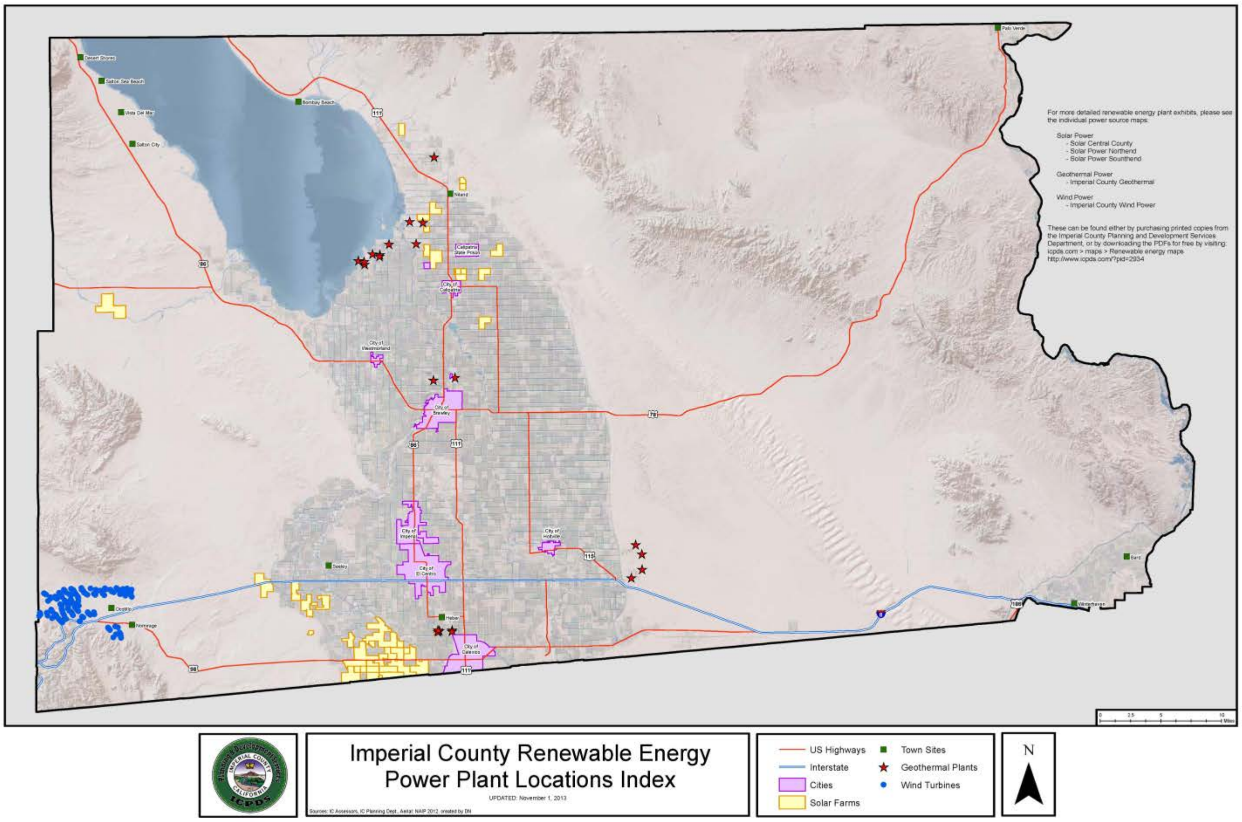


Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Niland monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

IV.2 Forecasts and Warnings

The ICAPCD published the National Weather Service (NWS) forecast for June 30, 2015 through July 4, 2015. The published notification, via the ICAPCD's webpage, forecast included a threat of brief heavy rain with south winds 5 to 10 miles per hour (mph). The evening forecast included a chance of showers and thunderstorms with southwest winds 10 to 15 mph. The notification advised the public of the potential of increased particulate matter concentrations to unhealthy levels because of gusty winds with some blowing dust for the southern and eastern portions of Imperial County and strong gusty winds for the northern and western portions of Imperial County. In addition, the Imperial Valley Press published a Significant Weather advisory effective through 1245 pm advising of winds in excess of 40 mph with periods of heavy rainfall and areas of blowing dust, reducing visibilities at or below 3 miles.

Finally, the ICAPCD issued a web-based Air Quality Index[13] on June 30, 2015 that identified Moderate levels of PM_{10} (51-100 μg/m^3) for the Niland area. The notice read: "Air quality is acceptable; however, for a very small number of people, there may be a moderate health concern." (**Figure 5-12**)

IV.3 Wind Observations

Wind data during the event were available from airports in eastern Riverside County, southeastern San Diego, southwestern Yuma County (Arizona), and Imperial County (**Table 2-2 through 2-4**). Similarly, other data from automated meteorological instruments east of the Niland monitor were available during the event. On June 30, 2015, the event Blythe Airport (KBLH) in eastern Riverside County and Yuma MCAS (KNYL) in Arizona measured wind gusts over 30 mph. Yuma MCAS (KNYL) measured winds of 30 mph and gusts of 38 mph at the 0554 and 0557 PST hour. At 0554 PST through 0657 PST and 0957 PST KNYL identified blowing dust. Haze was reported between 0857 PST and 0932 PST. Reduced visibility to 0.5 statute miles was reported at 1014. These observations are especially important as KNYL was upstream to Niland. Buttercup Ranger Station (MesoWest Station ID: BTTC1), Cactus (MesoWest Station ID: UP589), Cahuilla Ranger Station Wind (MesoWest Station ID: QCAC1), and Glamis (MesoWest Station ID: UP615), all measured gusts of over 25 mph. Winds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the June 30, 2015 event sufficient wind gusts with intermittent wind speeds at or above 25mph continued overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that the Niland monitor was affected by fugitive windblown dust from gusty winds caused by an intrusion of unstable monsoonal air from northern Mexico. This "gulf surge" moved southeast to northwest through Arizona and into southern California. Gusty winds associated with outflow boundaries swept across parts of Imperial County and caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements in the Niland and surrounding areas to the south of Niland during the event were high enough (at Cahuilla Ranger Station winds reached 26 mph, with wind gusts of 42 mph) that BACM PM_{10} control measures would have been overwhelmed.

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[13] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health .Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on June 30, 2015 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedance and the high wind event timeline and geographic location. The June 30, 2015 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

V.1 Discussion

Meteorological observations for June 30, 2015, identified an early-season monsoonal event and large disturbance that made its way from southeast to northwest through western Arizona and southern California from Mexico. The monsoonal event brought a significant amount of mid-level moisture and unsettled weather to the San Diego region, Riverside, Los Angeles and southwestern Arizona. On June 30, 2015, gusty south winds, associated with a large intrusion of unstable monsoonal air, entrained fugitive dust emissions from areas as far south as northeastern Mexico. The large intrusion of unstable monsoonal air surrounded Imperial County creating brief periods of rain and sufficient gusty winds entraining fugitive dust causing an exceedance at the Niland monitor.[14]

Entrained windblown dust from natural areas, particularly from the desert areas south and southeast of the Niland monitor, along with anthropogenic sources controlled with BACM, is confirmed by the meteorological and air quality observations June 30, 2015. Weather observations indicate that gusty southerly winds across dry, mostly barren soils of northern Mexico was directly responsible for the high PM_{10} concentrations observed in Imperial County on June 30, 2015. The NOAA's Satellite Services Division released a Smoke Text Product (June 30, 2015 (1049 PST) 1149 PDT) that identified patches of "light blowing dust over the desert regions of southern California this afternoon" (**Appendix A** for notice).

Figure 5-1 is an Aqua MODIS satellite image of clouds, associated with the monsoonal system moving into Imperial County. The entrained windblown dust affected air quality in Imperial County and caused an exceedance of the NAAQS at the Niland monitor on June 30, 2015.

[14] Area Forecast Discussion National Weather Service San Diego CA 830 PM PST (930 PM PDT) Monday, June 29, 2015 and 232 AM PST (332 AM PDT); 807 AM PST (907 AM PDT); 114 PM PST (214 PM PDT); 830 PM PST (930 PM PDT) Tuesday, June 30, 2015

FIGURE 5-1
MODIS TERRA SATELLITE IMAGE JUNE 30, 2015

Fig 5-1: A MODIS Terra satellite image (~1030 PST) captured the clouds as the leading edge of the monsoonal system moved northwesterly over southeastern California and southwestern Arizona. Source: NASA Worldview; https://worldview.earthdata.nasa.gov

Figure 5-2 is a series of NEXRAD base reflectivity images from the Yuma, Arizona station that show the progression of the system (clockwise, from upper left) as it approached southeastern California and southwestern Arizona. Although the leading edge of the system is south of the impacted region, powerful outflow winds in advance of the system caused the entrainment of dust into Imperial County.

FIGURE 5-2
NEXRAD BASE REFLECTIVITY COMPOSITE JUNE 30, 2015

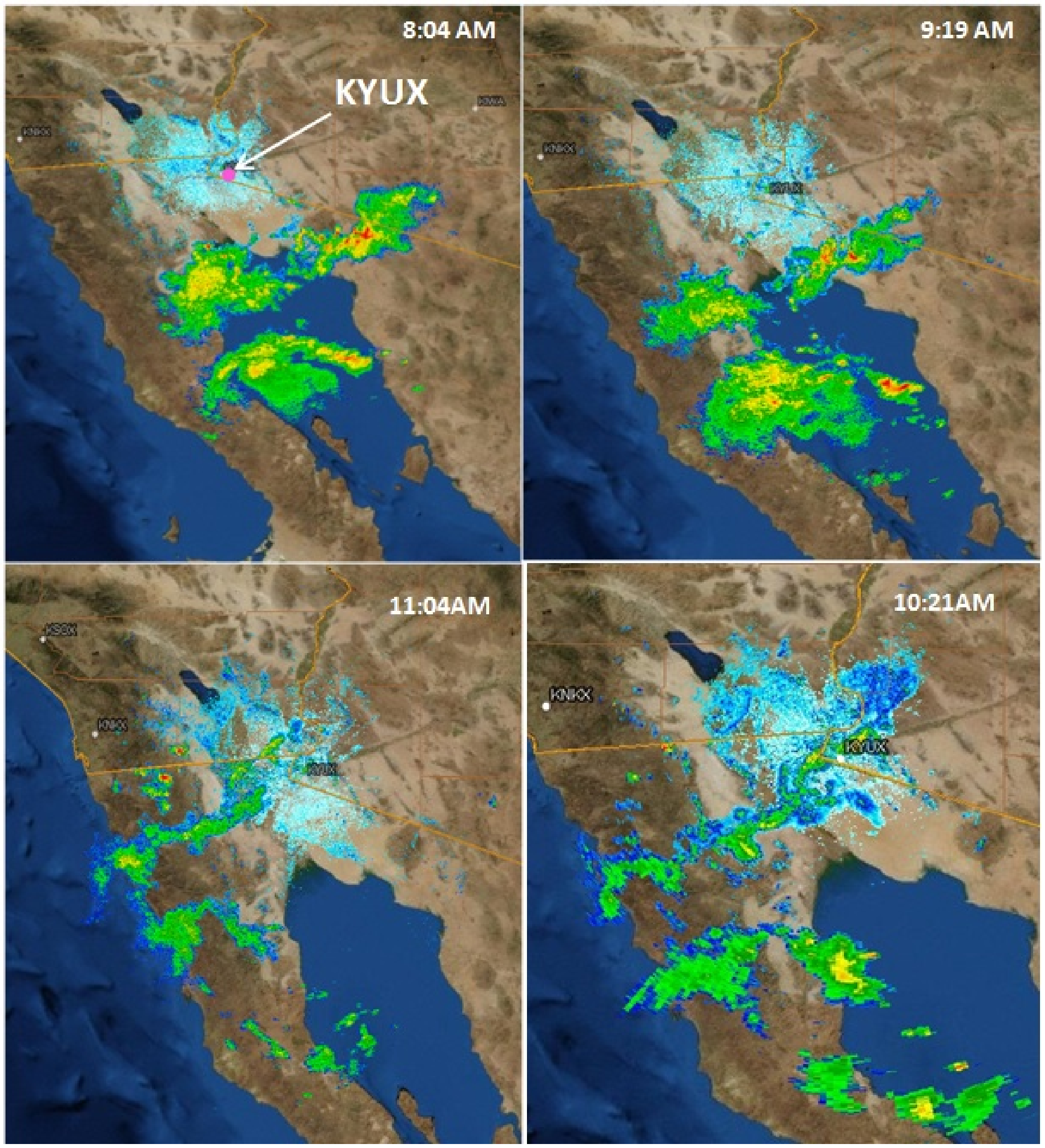

Fig 5-2: NEXRAD base reflectivity data from the Yuma, Arizona station (KYUX) shows the progression of the monsoonal system (clockwise, from top left) as it approaches the Imperial County. Warmer colors indicate stronger areas of the system. NEXRAD data is only available for the extreme southeastern part of Imperial County. Times are PST. Dynamically generated through NOAA's Weather and Climate Toolkit

Figure 5-3 is a NEXRAD base velocity image that provides a general idea of the velocity of winds across the region. Green colors indicate movement toward the Yuma, Arizona NEXRAD station. Red indicates movement away from the stations. This supports that strong winds were moving roughly southeast to northwest through the region.

FIGURE 5-3
NEXRAD BASE VELOCITY JUNE 30, 2015

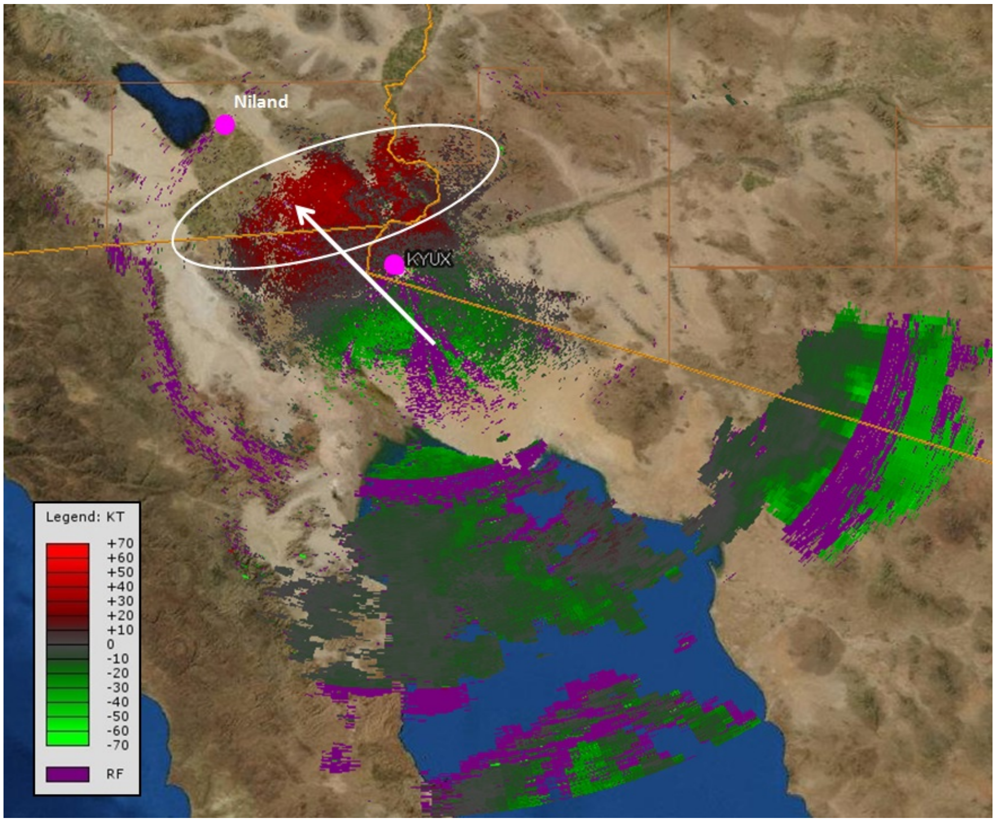

Fig 5-3: NEXRAD base velocity data from the Yuma, Arizona station (KYUX) captured at 1419 UTC/0619 PST on June 30, 2015. This was about the time winds in the region picked up and became gusty. Red colors indicate motion away from the KYUX site, while green indicates motion towards the site. Purple areas indicate range folding, or areas with imprecise radar returns. White arrow indicates the general direction of winds. Dynamically generated through NOAA's Weather and Climate Toolkit

The PM_{10} exceedance measured by the Niland monitor was a result of a monsoonal weather disturbance which, transported dust from the northern portion of the Sonoran Desert in Mexico. Portions of the natural open desert areas in extreme Imperial County and extreme southwestern Arizona also played a contributing role. During the early morning hours of June 30, 2015, the system moved northward into southern California, affecting Riverside and Imperial Counties and Yuma, Arizona. **Figure 5-4** shows a timeline of the events contributing to the exceedance. Refer to the image for location of the sites.

Gusty winds were measured in the early morning hours by meteorological stations in northern Mexico. Farther north near the international border, the Mexicali International Airport (Mexico), measured winds of over 20 mph during the morning hours on June 30, 2015.

A critical upstream wind site was the Yuma Marine Corps Air Station (KNYL) in southwestern Arizona, to the southeast and directly upstream from Niland. The site also provides a good analysis of the speed and suddenness of the monsoonal winds that impacted the area. At 0457 PST (**Appendix B**) the airport measured SSE winds of 9 mph with visibility of 10 miles. At 0557 PST conditions changed drastically as identified by the measured wind speed and gust at the KNYL airport, measured as 30 mph and gusts at 38 mph. Visibility reduced to one mile due to blowing dust. By 0757 PST winds reduced to 14 mph, then elevated back up until reaching a peak of 31 mph at 0947 PST. At 0957 PST the airport measured a peak gust of 40 mph. Blowing dust was still being reported and visibility continued to drop to 0.75 miles. Visibility ultimately dropped to 0.50 miles at 1014 PST.

FIGURE 5-4
NILAND EXCEEDANCE TIMELINE JUNE 30, 2015

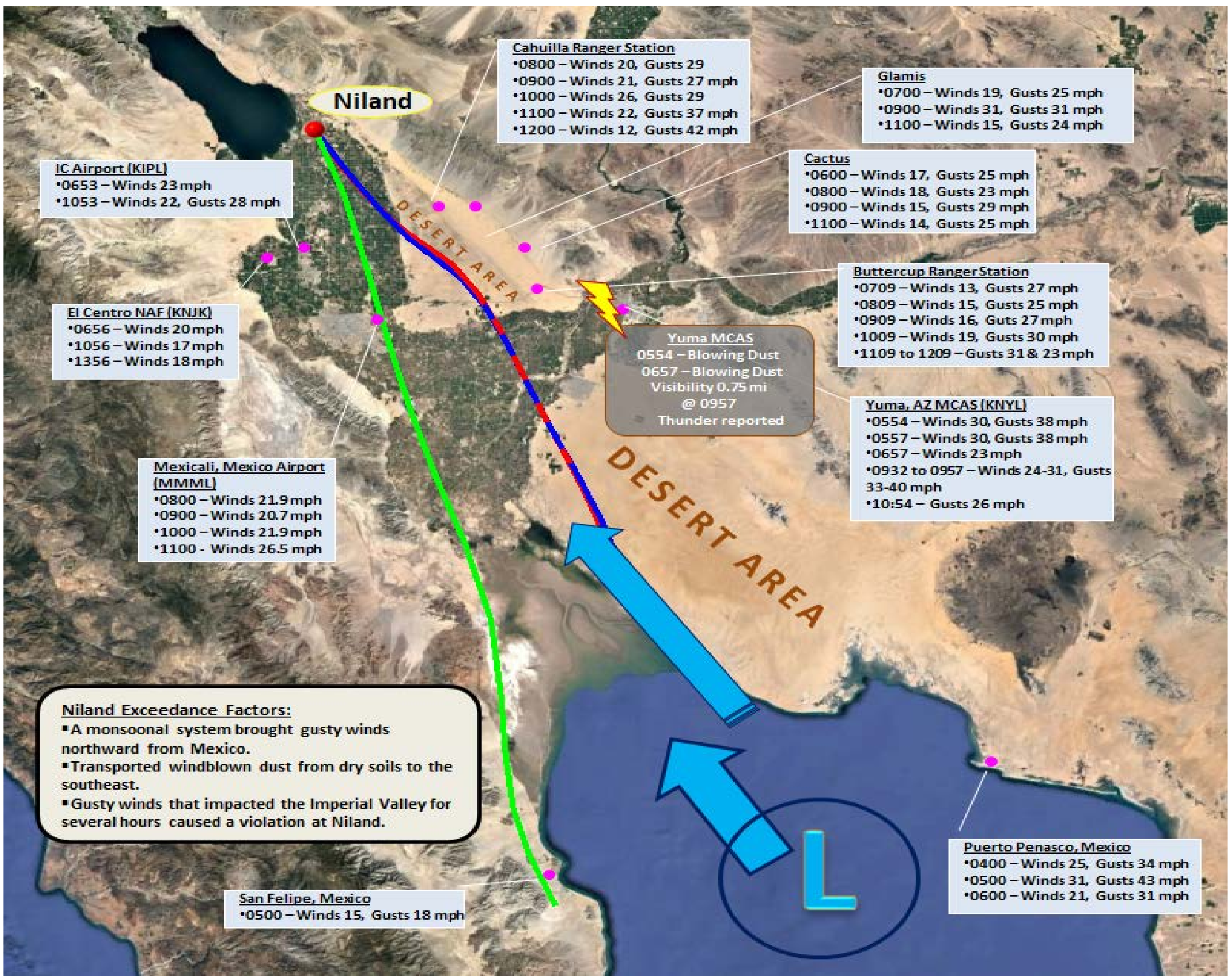

Fig 5-4: The monsoonal system moved northward from Mexico, bringing gusty winds with it. A 12-hour HYSPLIT back trajectory (see also **Figure 2-15**) illustrates the path of airflow at 1500m (green); 100m (blue); and 10m (red). The red and blue trajectories show air moved over the open desert areas in northern Mexico and the corner of southeastern California and southwestern Arizona. Dust was entrained downstream to Niland

Figure 5-5 is a 10-hour HYSPLIT forward trajectory that confirms the primary source area as outside of Imperial County within the natural open areas of the Sonoran Desert of northern Mexico. The trajectory models air at the 10m level as it moved northwest on the eastern portion of the Imperial County. The ending time of 1700UTC translates into 0900 PST which correlates with the hour that Niland measured an elevated PM_{10} concentration of 448 µg/m^3. Transported dust emissions from natural desert open areas of southeastern Imperial County and northern Mexico caused an exceedance at the Niland monitor.

FIGURE 5-5
FORWARD HYSPLIT – SOURCE AREA

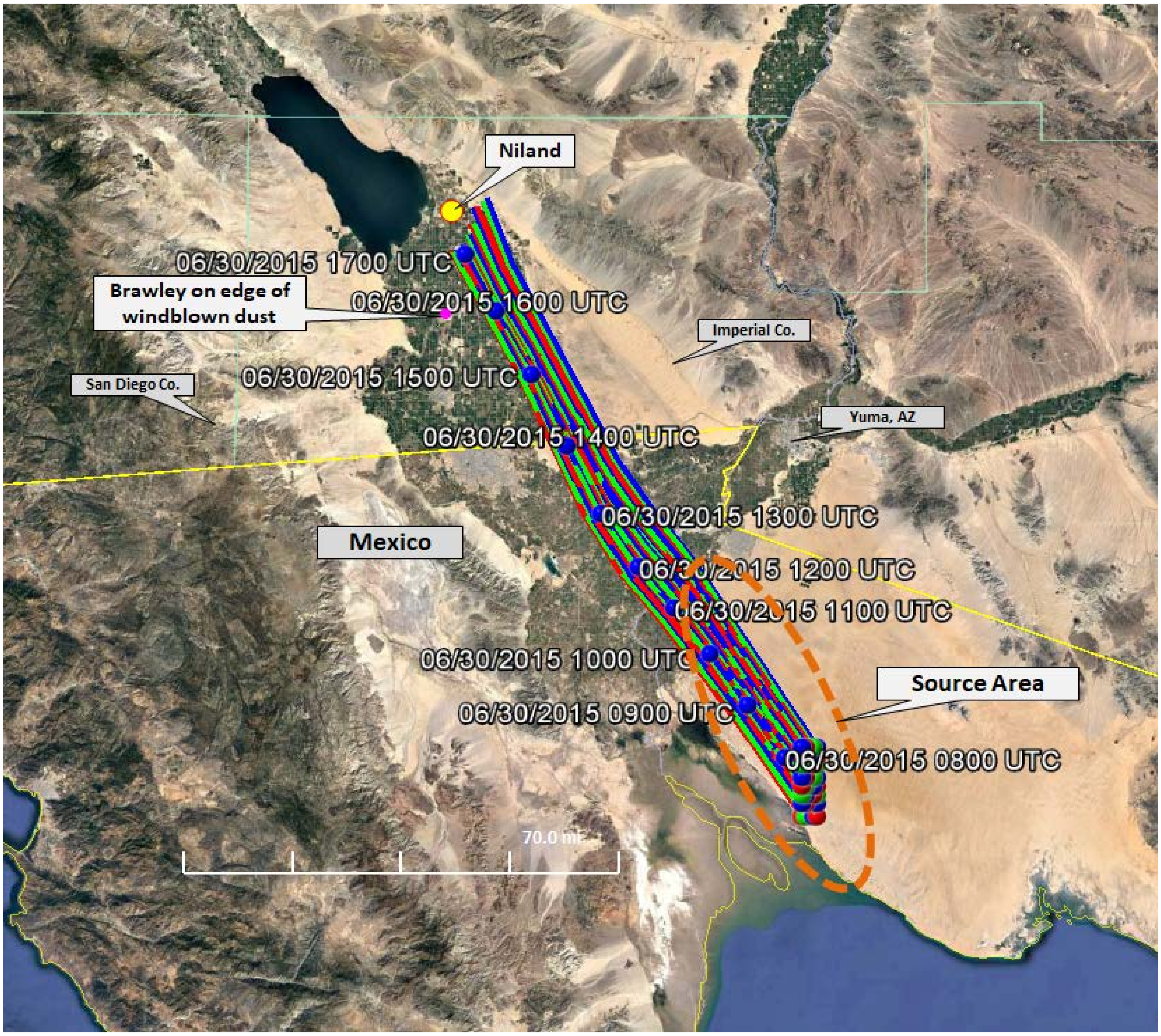

Fig 5-5: A 10-hour forward-trajectory HYSPLIT ending at Niland on June 30, 2015 at 0900. This is at the hour that Niland measured the first dramatic spike in PM_{10} concentrations. Airflow is coming from a south-southeast direction over the dry soils of the Sonoran Desert. Trajectories depict airflow at the 10-meter AGL (above ground level. Dynamically generated through NOAA's Air Resources Laboratory

The middle box in **Figure 5-6** illustrates the surface airflow over the desert soils of northern Mexico for nearly five of the 10 hours modeled by the HYSPLIT. Like the back-trajectory depicted in **Figure 5-4** and **Figure 2-25**, the forward trajectory shows that airflow was east of Brawley. As noted in Section II, there will be minor differences between airflow depicted by the HYSPLIT trajectories and measured station wind direction.

FIGURE 5-6
HYSPLIT FORWARD TRAJECTORY

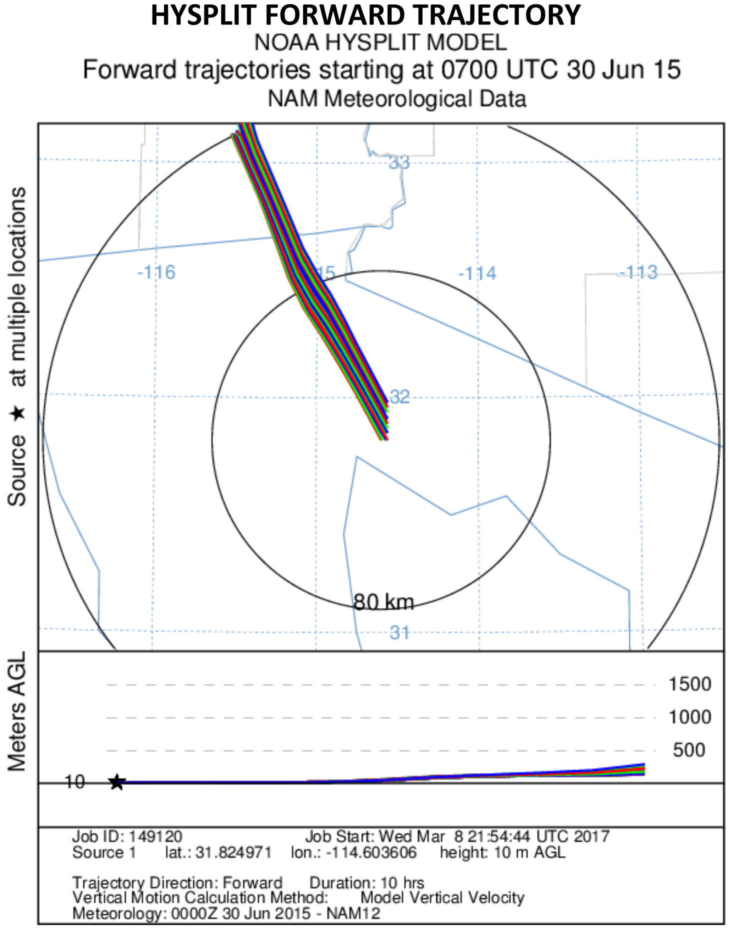

Fig 5-6: A 10-hour forward-trajectory HYSPLIT ending at Niland on June 30, 2015 at 0900 PST. This is one of the hours that Niland measured elevated concentrations of PM_{10}. Air flow is coming from a south-southeast direction over the dry soils of the Sonoran Desert. The middle box shows that a majority of the airflow over the desert was on the surface for almost half of the 10-hour trajectory. Trajectories depict air flow at the 10-meter AGL (above ground level. Dynamically generated through NOAA's Air Resources Laboratory

The EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states.[15] **Tables 5-1 through 5-2** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the exceeding monitors. The Niland monitor shows peak hourly concentrations following or during the periods of continual gusty winds from

[15] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

the southeast.

TABLE 5-1
WIND SPEED AND PM_{10} CONCENTRATIONS FOR NILAND AND BRAWLEY JUNE 30, 2015

*YUMA MCAS (KNYL)				*BUTTERCUP RANGER STATION (BTTC1)				*CACTUS (UP589)				*CAHUILLA RANGER STATION (BTTC1)					NILAND	BRAWLEY
HOUR	**W/S**	**W/G**	**W/D**	**HOUR**	**W/S**	**W/G**	**W/D**	**HOUR**	**W/S**	**W/G**	**W/D**	**HOUR**	**W/S**	**W/G**	**W/D**	**HOUR**	**PM_{10} (µg/m³)**	**PM_{10} (µg/m³)**
057	3		180	009	6	14	173	015 045	5 3	8 4	207 202	010	6	17	134	000	31	34
157	9		170	109	0	7		100				110	4	12	77	100	26	22
257	5		160	209	2	6	60	240	2	8	132	210	6	10	90	200	28	24
357	7		140	309	6	9	109	300				310	6	9	70	300	22	32
457	9		160	409	4	10	112	410	6	10	176	410	7	9	63	400	41	21
554 557	30 30	38 38	150 150	509	7	10	110	515 525 550	7 4.9 13	11 12 18.1	184 196 181	510	10		95	500	50	34
657	23		170	609	12	17	127	610	17	25	197	610	9	12	113	600	116	58
757	14		180	709	13	27	161	740	20	26	222	710	20		136	700	130	151
857	20		180	809	15	25	166	830	21	23	207	810	20	29	147	800	110	145
924 932 939 947 957	24 29 29 31 28	33 36 37 39 40	180 170 170 170 180	909	16	27	179	910 925 950	19 29 15	29 29 29	235 223 233	910	21	27	152	900	448	127
1014 1024 1044 1053 1054	14 16 14 10 10	26 25 21	210 210 290 260 250	1009	19	30	169	1030 1050	19 17	31 21	242 236	1010	26	29	155	1000	992	127
1102 1114 1157	9 8 15	22	210 180 200	1109	7	31	271	1150	14	25	240	1110	22	37	169	1100	992	697
1257	No Data			1209	15	23	194	1240	16	20	216	1210	12	42	249	1200	406	126
No Data				1309	9	18	170	1325	12	13	210	1310	14	31	142	1300	292	62
				1409	6	13	157	1400	8.1	14	227	1410	9	21	154	1400	210	73
				1509	3	11	209	1525	4	11	240	1510	5	21	174	1500	91	32
				1609	3	10	215	1605 1635	9 4.9	10 9	264 220	1610	8	15	210	1600	79	21
				1709	4	210	215	1705 1725 1750	4 1 4.9	8.1 7 7	315 347 321	1710	7	12	243	1700	23	20
				1809	3	9	237	1800				1810	4	13	255	1800	84	34
				1909	3	6	208	1915	4	4	238	1910	3	12	229	1900	44	101
				2009	0	5		2030	4	4	235	2010	3	9	184	2000	51	62
				2109	6	10	200	2105	7	12	263	2110	3	6	135	2100	40	39
				2209	7	13	193	2220	11	13	236	2210	12		148	2200	44	52
				2309	14	24	165	2315 2335	19 15	21 23	225 209	2310	21		139	2300	58	69

*All meteorological measurements within the table adjusted to match measured concentrations in PST. Wind data for Yuma from the NCEI's QCLCD system. Wind data for Buttercup, Cactus and Cahuilla from the University of Utah's MesoWest system. Wind speeds = mph; Direction = degrees

TABLE 5-2
WIND SPEEDS AND PM_{10} CONCENTRATIONS FOR NILAND AND BRAWLEY JUNE 30, 2015

CAMPO (CPOSD)				EL CENTRO NAF (KNJK)				IMPERIAL COUNTY AIRPORT (KIPL)				BLYTHE AIRPORT (KBLH)				NILAND				NILAND	BRAWLEY
HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/G	W/D	HOUR	W/S	W/D	HOUR	PM_{10} (µg/m³)	PM_{10} (µg/m³)
52	5		10	56	8		90	53	8		120	52	11		200	0	7.6	106	0	31	34
152	0		0	156	6		150	153	9		150	152	9		190	100	7.1	110	100	26	22
252	5		60	256	6		100	253	8		110	252	10		180	200	5	107	200	28	24
352	6		50	356	3		40	353	6		120	352	10		180	300	4.6	104	300	22	32
452	5		40	456	5		100	453	7		100	452	14		170	400	4.8	134	400	41	21
552	0		0	556	7		110	553	9		110	552	13		180	500	2.6	137	500	50	34
652	0		0	656	20		120	653	23		140	652	16		180	600	7.1	139	600	116	58
752	0		0	756	17		140	753	15		140	752	18		180	700	15.4	143	700	130	151
852	6		200	856	15		150	853	14		180	852	25	33	180	800	13.9	141	800	110	145
952	3		VR	956	13		170	953	8		180	952	25	33	170	900	13.5	141	900	448	
1052	20	25	190	1038	20		120	1053	22	28	150	1052	24	34	180	1000	13.6	150	1000	992	127
				1056	17		130														
1152	13		180	1156	6		80	1153	11		230	1150	24	34	190	1100	20.4	160	1100	992	697
												1152	23	34	190						
1252	11		350	1256	10		210	1253	13		230	1201	22	31	200	1200	11	239	1200	406	126
												1252	18	28	240						
1352	3		VR	1356	18		250	1353	9		150	1352	16	25	240	1300	7.2	265	1300	292	62
1452	5		340	1456	15		220	1453	0		0	1452	17	22	210	1400	6.2	209	1400	210	73
1552	5		310	1556	8		160	1553	6		240	1552	17		220	1500	9.1	186	1500	91	32
1652	0		0	1656	6		VR	1653	6		250	1652	14		240	1600	7.4	185	1600	79	21
1752	8		250	1756	5		170	1753	5		250	1752	14		230	1700	7.8	181	1700	23	20
1852	10		200	1856	6		130	1853	5		170	1852	15		230	1800	5.5	158	1800	84	34
1952	7		200	1956	8		150	1953	6		140	1952	10		210	1900	6	121	1900	44	101
2052	0		0	2056	9		120	2053	7		150	2052	10		180	2000	6.9	119	2000	51	62
2152	0		0	2156	9		190	2153	10		160	2119	11		190	2100	6.8	112	2100	40	39
												2128	11		210						
												2143	11		190						
												2150	9		190						
												2152	7		190						
2252	5		30	2256	10		190	2253	10		180	2252	7		160	2200	4.4	143	2200	44	52
2352	0		0	2356	14		130	2353	17		160	2352	17		180	2300	11.8	120	2300	58	69

Wind data for KIPL, KNYL, and KNJK from the NCEI's QCLCD system. Wind data for Blyth (KBLH) and Campo (CPOSD) from the University of Utah's MesoWest system. Wind speeds = mph; Direction = degrees

Figure 5-7 depicts regional wind speeds[16] over a 72-hour period. The jump in wind speeds came roughly between 0500 PST and 1400 PST. Despite the inconsistent spikes between sites gusts were prominently measured at stations located to the east of Niland. All sites experienced increases in winds during the early hours of June 30, 2015.

FIGURE 5-7
72 HOUR WIND SPEEDS REGIONAL SITES

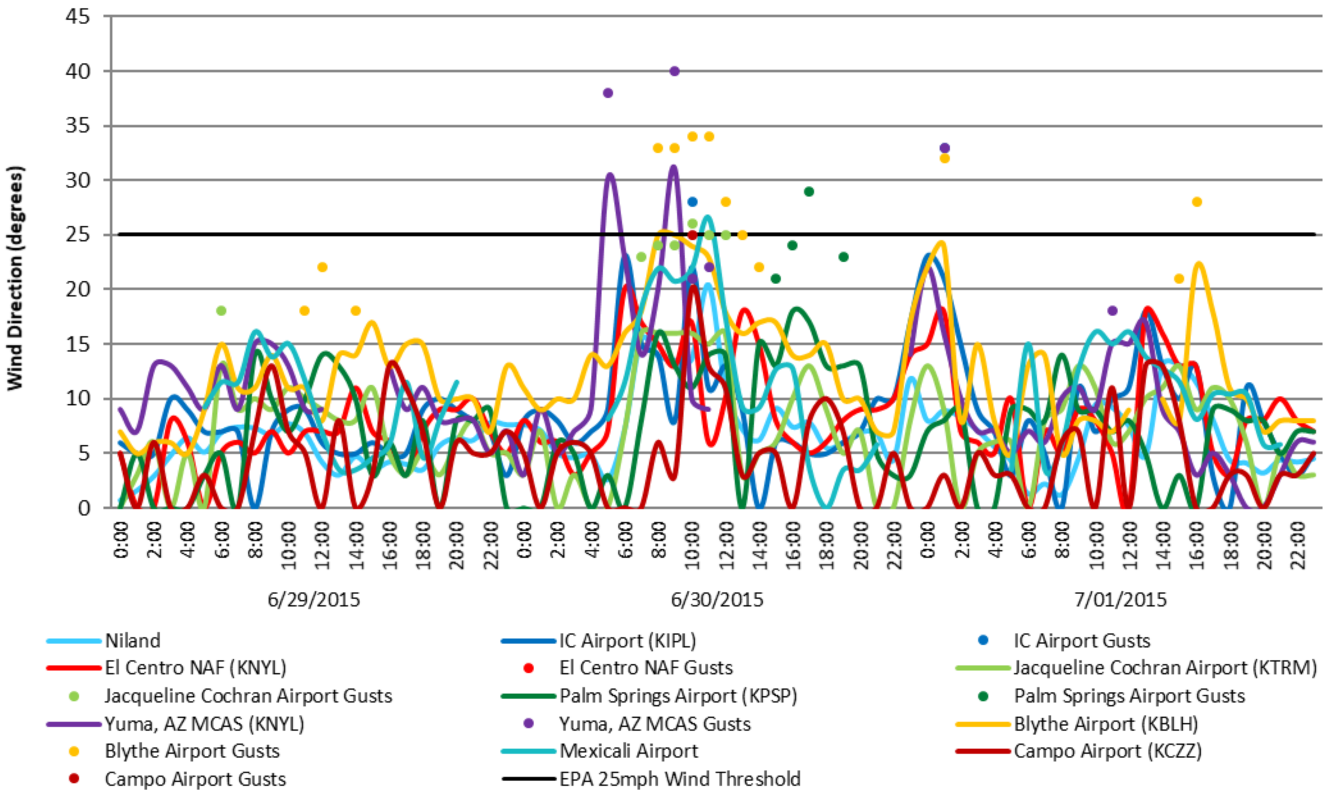

Fig 5-7: Meteorological data collected from thirteen sites within the Imperial, Riverside, Yuma and Mexicali, Mexico over a 3-day period from June 29, 2015 to July 1, 2015 shows a uniform spike in wind speed during the June 30, 2015 exceptional event

Figures 5-8 and **5-9** illustrate the temporal relationship between the high winds and the entrained dust affecting the Niland monitor during a 24-hour and 72-hour period. The positive correlation of hourly measured concentrations from the Niland monitor and the elevated wind speeds on June 30, 2015 (**Fig 5-8**) indicate that as wind speeds increased so did concentrations of PM_{10}. The peak hourly PM_{10} concentration occurred throughout the morning hours, which are associated with the high peak winds and gusts measured at upstream stations that transported dust

[16] National Weather Service; NOAA's Glossary – Wind Speed: The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall); http://w1.weather.gov/glossary/index.php?letter=w.

downstream. In the days before and after June 30, 2015 (**Fig 5-9**) concentrations at Niland are moderate or low as winds remain light.

FIGURE 5-8

PM_{10} CONCENTRATIONS AND WIND SPEED CORRELATION JUNE 30, 2015

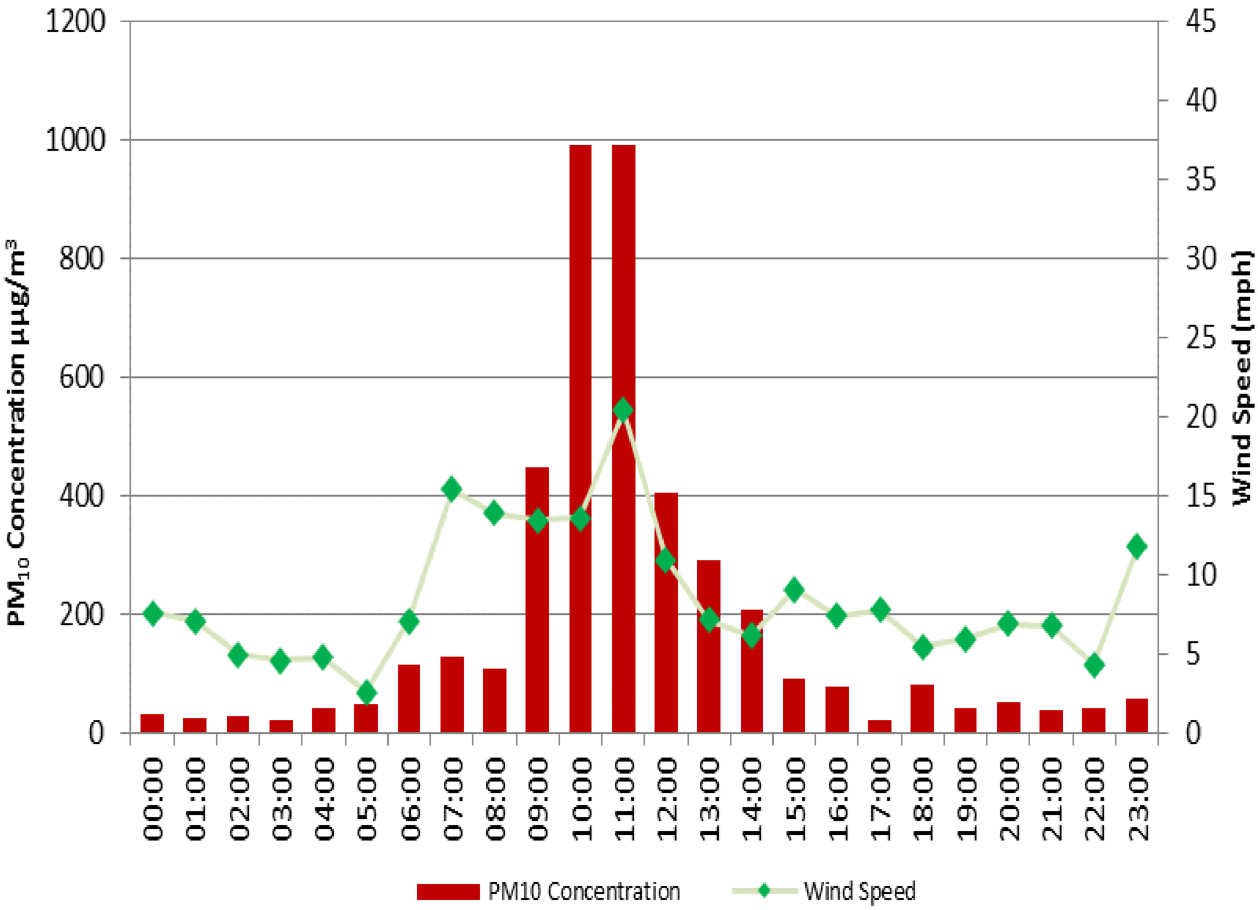

Fig 5-8: Niland measured the greatest concentrations during the period of highest wind speeds. Air quality data from the EPA's AQS data bank. Wind data from the NCE's QCLCD system and the University of Utah's MesoWest

FIGURE 5-9
72 HOUR PM_{10} CONCENTRATIONS AND WIND SPEED CORRELATION

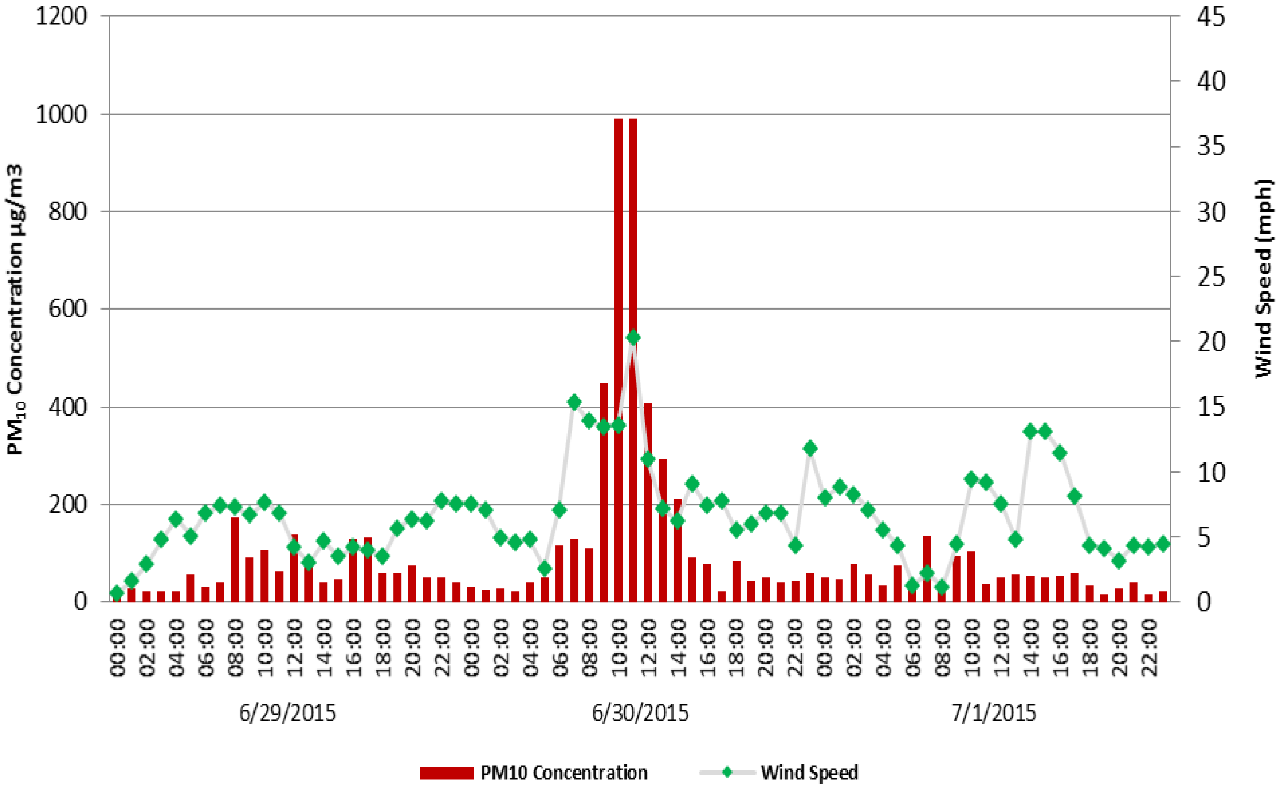

Fig 5-9: Niland concentrations were subdued in the day before and after the event day. Niland PM_{10} concentrations show a positive correlation as high winds affected the area on June 30, 2015. Air quality and wind data from the EPA's AQS data bank

Figure 5-10 depicts upstream wind speeds and hourly concentrations at Niland over a 72-hour period. A jump in wind speeds occurs shortly before a rise in hourly concentrations at Niland. Puerto Peñasco, Mexico shows a large spike in winds. These winds would have passed over the source area and suspended dust. **Appendix C** contains additional graphs illustrating the relationship between the high PM_{10} concentrations and increased wind speeds from other monitoring sites within Imperial, Riverside, and Yuma counties on June 30, 2015**.**

FIGURE 5-10
72 HOUR PM_{10} CONCENTRATIONS AND UPSTREAM WIND SPEEDS

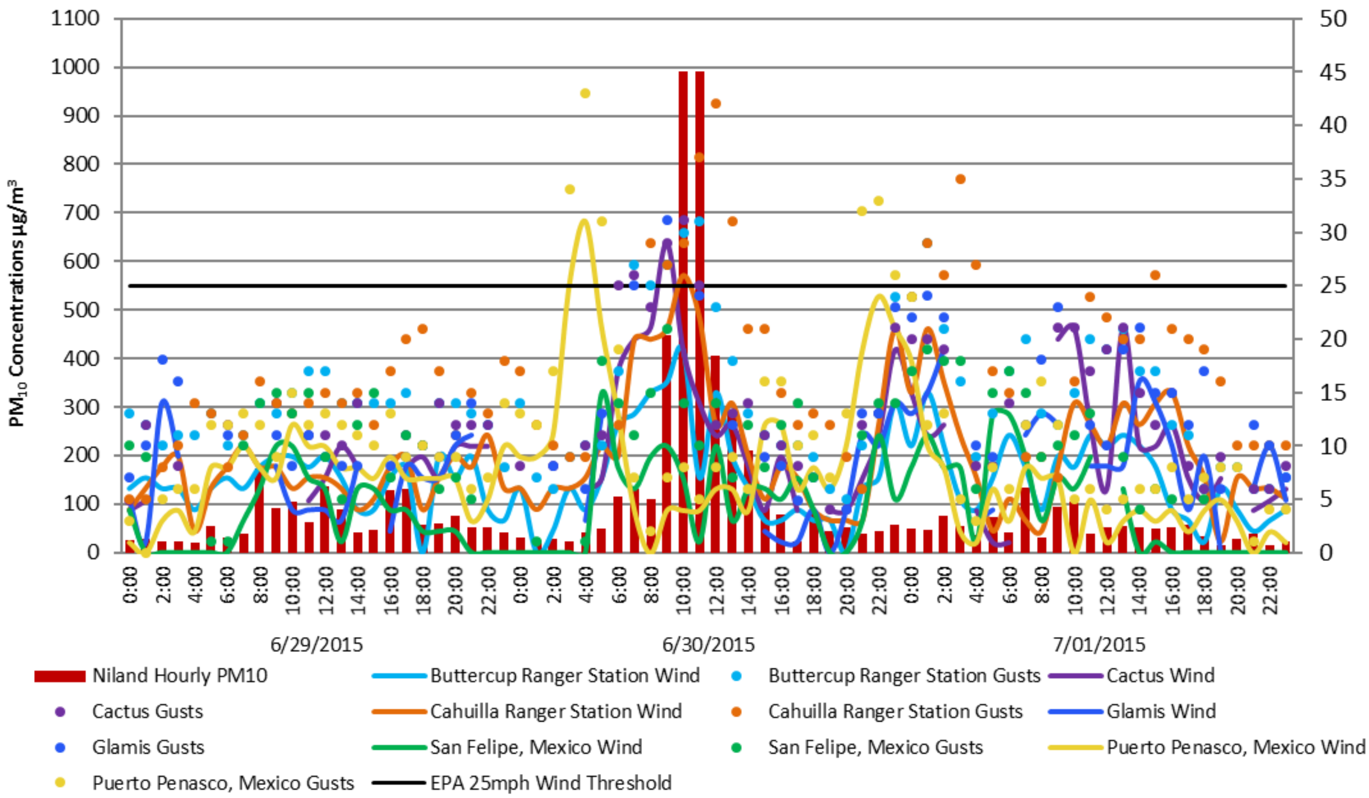

Fig 5-10: Upstream sites demonstrate the elevated winds that transported windblown dust during the event day. Niland PM_{10} concentrations show a positive correlation as high winds affected the area on June 30, 2015. Elevated winds the day following the event did not cause high concentrations at Niland due to a change in wind direction and moisture in surrounding areas from the evening before. Air quality and wind data from the EPA's AQS data bank

Figure 5-11 shows the measured PM_{10} concentrations relative to the observed visibility at Yuma MCAS (KNYL). The Yuma MCAS a critical upstream site from Niland, measured the elevated winds and reported blowing dust as the system moved into the area. For reasons discussed in section II neither the El Centro NAF (KNJK) nor the Imperial County (KIPL) had much of a visibility issue. KIPL saw visibility drop to eight miles at 1053 PST, while KNJK saw a drop to nine miles at 1156 PST. The vastly reduced visibility at KNYL is relevant to the exceedance at Niland because of the station's upstream location. Blowing dust was observed at the airport at 0554 PST, 0557 PST, 0657 PST, 0957 PST and haze at 0857 PST, 0924 PST and 0932 PST. Visibility reduced to 0.75 miles at 0957 PST. As discussed above, an identified thunderstorm was being tracked by the NWS from San Luis as well as a thunderstorm from the Gadsden area. The time it took the storm to reach the eastern section of Imperial County is coincident with the measured elevated concentrations. In addition, the first incident of blowing dust at Yuma MCAS, would confirm the existence of a moving thunderstorm. Combined the information above supports the affect upon air quality in Imperial County and the source of dust emissions that affected the Niland monitor.

FIGURE 5-11
72 HOUR PM_{10} CONCENTRATIONS AND VISIBILITY
AT YUMA MCAS (KNYL)

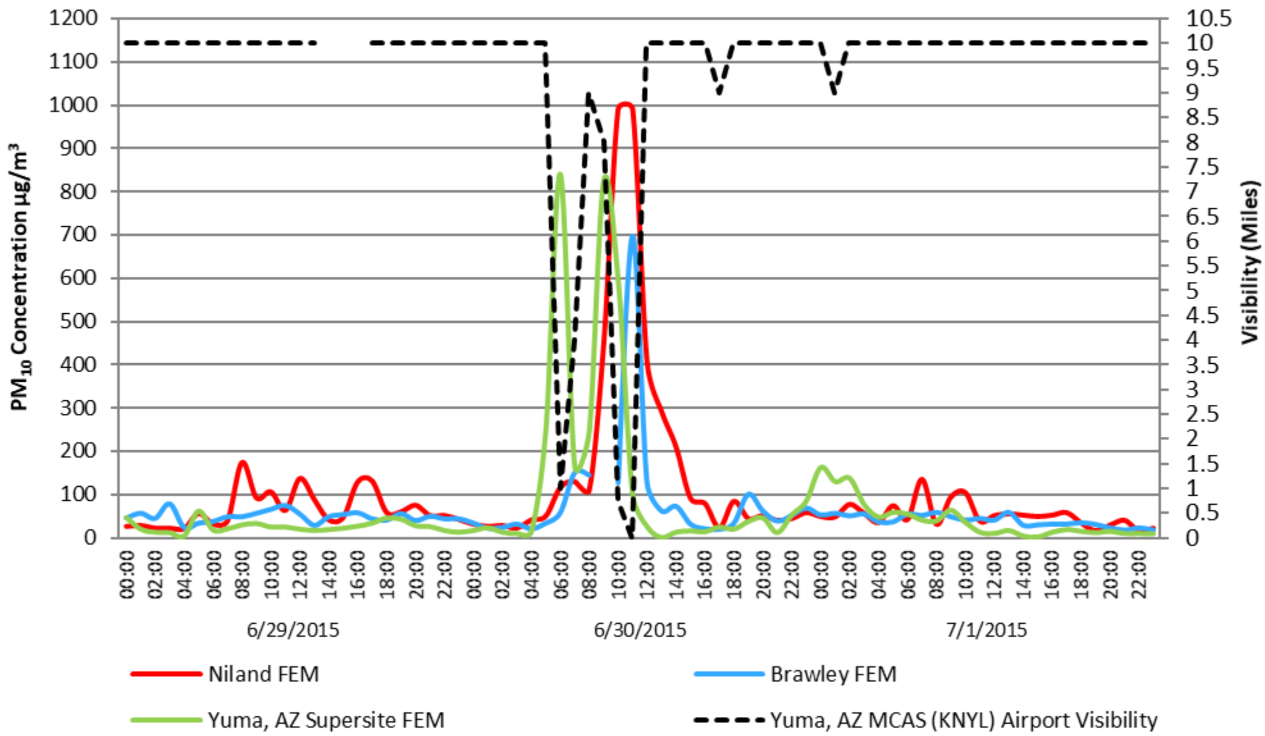

Fig 5-11: The graph illustrates the observed visibility level at Yuma MCAS (KNYL) and hourly concentrations at Yuma Supersite, Brawley, and Niland. Blowing dust was observed at KNYL shortly before elevated concentrations were measured at the Niland monitor.

As discussed above, the San Diego NWS office released a Special Weather Statement at 1138 am PST identifying the movement of a strong thunderstorm near Campo, California while the IV Press published a "Significant weather advisory for southern Imperial County" issued at 1101 am PST identified a strong thunderstorm near Gordon Wells or 20 miles northwest of Gadsden, Arizona moving west at 40 mph (**Figure 2-22**). Preceding this advisory the Phoenix NWS office issued at 0956 am PST a Significant Weather Statement which identified the tracking of the same thunderstorm 11 miles east of San Luis moving northwest at 35 mph. As the monsoonal system moved north, preceding winds were increasing as the associated thunderstorms headed towards Imperial County. A useful measurement of the degradation of air quality is the Air Quality Index (AQI).[17] Air quality alerts issued for the Niland area advised of unhealthy conditions for sensitive

[17] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after

groups such as the elderly and children.

Figure 5-12 provides the resultant AQI for June 30, 2015. As thunderstorm outflow winds reached Imperial County, the level of reduced air quality became evident when the AQI level changed from "Green" or Good level to "Yellow" or Moderate. The lower air quality affirms that on June 30, 2015 strong gusty southeasterly winds transported windblown dust into Imperial County affecting air quality.

FIGURE 5-12
AIR QUALITY INDEX FOR NILAND JUNE 30, 2015

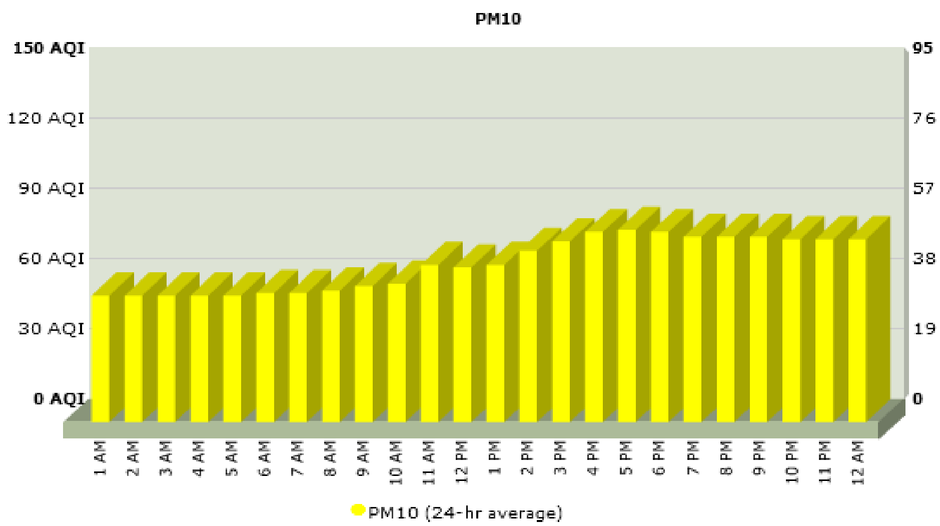

Fig 5-12: Demonstrates that air quality in Imperial County reduced when thunderstorm outflow winds blew into Imperial County transporting windblown dust on June 30, 2015

V.2 Summary

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the monsoonal system that moved into Imperial County. The information provides a clear causal relationship between the transported windblown dust and the PM_{10} exceedance measured at the Niland monitor on June 15, 2015. Furthermore, the advisories and air quality index illustrate the affect upon air quality within the region extending from the desert regions in northern Mexico and into the eastern portion of Imperial County. Large amounts of coarse particles (dust) and PM_{10} transported by

breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi gusty southeasterly winds caused a change in the air quality conditions within Imperial County. The transported windblown dust originated from as far as the natural open desert regions in northern Mexico. Combined, the information demonstrates that the elevated PM_{10} concentrations measured on June 30, 2015 coincided with high wind speeds and that gusty southeasterly winds affected the southern portion of Riverside County, southeastern San Diego County, all of Imperial County, and parts of Arizona.

FIGURE 5-13
JUNE 30, 2015 WIND EVENT TAKEAWAY POINTS

Fig 5-13: Illustrates the factors that qualify the June 30, 2015 natural event which affected air quality as an Exceptional Event

VI Conclusions

The PM_{10} exceedance that occurred on June 30, 2015, satisfies the criteria of the EER which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 6-1 TECHNICAL ELEMENTS CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	6-34
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	49-62
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	35-39
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	40-48
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	49-62

VI.1 Affects Air Quality

The preamble to the revised EER states that an event has affected air quality if the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the June 30, 2015 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 defines an exceptional event as an event that must be “not reasonably controllable or preventable” (nRCP). The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. A natural wind event, which transports dust from natural open deserts, meets the nRCP, when sources are controlled by BACM and when human activity plays little to no direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, strong gusty winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Niland monitor caused by naturally occurring strong gusty southeasterly winds transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert in Arizona and Mexico to the south and southeast of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at Niland on June 30, 2015, were not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50), which may recur at the same location, is an event where human activity plays little or no direct causal role. The criteria that human activity played little or no direct causal role occurs when the event, along with its resulting emissions, are solely from natural sources or where all significant anthropogenic sources of windblown dust have been reasonably controlled. As discussed within this demonstration, windblown dust anthropogenic sources reasonably controlled with BACM in and around Niland on June 30, 2015 meet the criteria that human activity played little or no direct causal role therefore, the event qualifies as a natural event.

VI.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at Niland during different days, and the comparative analysis of different monitors in Imperial, Riverside and Yuma counties demonstrates a consistency of elevated gusty southeasterly winds and concentrations of PM_{10} on June 30, 2015 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty southeasterly winds were an event that was widespread, regional and not preventable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty southeasterly winds. Days immediately before and after the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the windblown dust emissions to the exceedance on June 30, 2015.

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM_{10} concentrations measured at the Niland monitor were historically unusual compared to a multi-year data set (Section III).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

This section contains issued notices by the NWS and Imperial County pertinent to the June 30, 2015 event. Along with NWS notices, this Appendix contains any issued air quality alerts. Air quality alerts advise sensitive receptors of potentially unhealthy conditions in Imperial County resulting from a natural event. On June 30, 2015, the data illustrates a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in

Imperial County.

Appendix B: Meteorological Data

This Appendix contains the time series plots, graphs, wind roses, etc. for selected monitors in Imperial, Riverside and Yuma counties along with other pertinent graphs, time series plots for other areas if applicable. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds

This Appendix contains the graphs depicting the correlations between PM_{10} Concentrations and elevated wind speeds for selected monitors within Imperial, Riverside, San Diego, and Yuma counties if applicable. Other areas are also included if applicable such as Mexico. These graphs demonstrate the region wide impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule

This Appendix contains a description of the compilation of the BACM adopted by the ICAPCD and approved by the USEPA. Seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.